


1985

Efficient Action in the Construction of Field Fortification: A Study of the Civil War Defenses of Raleigh, North Carolina

Thomas F. Higgins
College of William & Mary - Arts & Sciences

Follow this and additional works at: <https://scholarworks.wm.edu/etd>

 Part of the [Military History Commons](#), [Social and Cultural Anthropology Commons](#), and the [United States History Commons](#)

Recommended Citation

Higgins, Thomas F., "Efficient Action in the Construction of Field Fortification: A Study of the Civil War Defenses of Raleigh, North Carolina" (1985). *Dissertations, Theses, and Masters Projects*. Paper 1539625291.

<https://dx.doi.org/doi:10.21220/s2-zbrc-jz42>

This Thesis is brought to you for free and open access by the Theses, Dissertations, & Master Projects at W&M ScholarWorks. It has been accepted for inclusion in Dissertations, Theses, and Masters Projects by an authorized administrator of W&M ScholarWorks. For more information, please contact scholarworks@wm.edu.

EFFICIENT ACTION IN THE CONSTRUCTION
OF FIELD FORTIFICATION: A STUDY OF
THE CIVIL WAR DEFENSES OF
RALEIGH, NORTH CAROLINA

A Thesis

Presented to
The Faculty of the Department of Anthropology
The College of William and Mary in Virginia

In Partial Fulfillment
Of the Requirements for the Degree of
Master of Arts

by
Thomas F. Higgins, III

ProQuest Number: 10626529

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 10626529

Published by ProQuest LLC (2017). Copyright of the Dissertation is held by the Author.

All rights reserved.

This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 - 1346

APPROVAL SHEET

This thesis is submitted in partial fulfillment
of the requirements for the degree of

Master of Arts

Thomas F. Higgins
Author

Approved, May 1985

Theodore R. Reinhart
Theodore R. Reinhart

Vinson H. Sutlive
Vinson H. Sutlive

Marley R. Brown, III
Marley R. Brown, III

All fortifications in America, except for the security of particular objects, considering the nature of the country are rather prejudicial than useful: the country is taught to expect security, and always loose their confidence upon any unfortunate event: (Greene 1777 quoted from Ford 1971: 10).

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS.....	v
LIST OF FIGURES.....	vi
ABSTRACT.....	viii
INTRODUCTION.....	2
CHAPTER I. THE EVOLUTION OF FIELD FORTIFICATION, 17th-19th CENTURIES.....	7
CHAPTER II. THE IMPACT OF WEAPON TECHNOLOGY AND WARFARE STRATEGY ON THE DEVELOPMENT OF FIELD FORTIFICATION.....	22
CHAPTER III. THE RALEIGH FORTIFICATIONS.....	38
CHAPTER IV. MAXIMUM BENEFIT THROUGH MINIMAL EFFORT..	56
APPENDIX.....	68
BIBLIOGRAPHY.....	69

ACKNOWLEDGEMENTS

The writer wishes to express his appreciation to Professor Theodore Reinhart for his patient guidance and criticism throughout the writing of this thesis. The author is also indebted to Professor Vinson Sutlive and Marley Brown for their constructive criticism of the manuscript. Special thanks to Virginia Caldwell, Natalie Larson, Tamera Mams, and Kathleen Pepper for their assistance in the preparation of the graphic material and text.

LIST OF FIGURES

Figure		Following Page
1.	12th Century Castle of La Roche-Pont, France	7
2.	17th Century Fortified Town of La Roche-Pont	8
3.	Detail of Outworks of La Roche-Pont.....	9
4.	17th Century Fortified Town of Lisle, France	10
5.	Open and Half-closed Works.....	14
6.	19th Century Field Casemates.....	14
7.	Obstacles.....	15
8.	Shelter Trenches.....	16
9.	American Fortified Positions on the Delaware River.....	18
10.	Major Railroads in North Carolina, 1861-1865	39
11.	Receipt Given to Moses A. Bledsoe.....	43
12.	A Note Given to Moses A. Bledsoe.....	45
13.	Pay Roll Account Record for Slaves from Davie County, North Carolina.....	45
14.	Confederate Fortifications of Raleigh, North Carolina.....	45
15.	The Top of the Breastwork.....	47
16.	Contour Map of Raleigh, North Carolina.....	48
17.	Retracing of the Confederate Defenses of Raleigh, North Carolina.....	49
18.	Location of the Northern Fortification Network around Raleigh, North Carolina.....	49

Figure (cont.)	Following Page
19. Remnant of Northern Fortification Network....	49
20. Downtown Boulevard as Seen from Northern Fortification.....	49
21. Plan View of Fortifications Identified in the 1936 Federal Writer's Project and Adjacent to the Downtown Boulevard.....	50
22. Contour Map of Northern Fortifications Identified in the 1936 Federal Writer's Project..	50
23. Rifle Pits as Part of the Northern Fortification Network.....	50
24. Rifle Pits.....	50
25. Main Trench Line in the Northern Fortifications.....	50
26. "The Southern Viewpoint".....	53

ABSTRACT

The study of field fortification from the late 17th century to the mid-19th century indicates that fundamental principles guided construction techniques and established a pattern of thinking in fieldwork design. The application of these principles were considered important in the eventual success of the work. The principles were based on the achievement of maximum benefit through minimal effort. Continual adherence to a plan of efficient action with least effort in fortification construction was essential as weapons became more effective and strategies and tactics more diverse.

The examination of the construction techniques utilized in the building of the Civil War defenses around Raleigh, North Carolina demonstrate the basic principles common in fieldwork construction during the 18th and 19th centuries and provide valuable insight into a relatively unexplored event in Raleigh's history.

INTRODUCTION

Two major goals in modern archaeological research -- historical reconstruction and delineation of cultural process -- are often easier to discuss as objectives in material culture study than to actually achieve in research. Nonetheless, the well-known works of James Deetz (1977) and Mark Leone (1978) indicate that the task is not impossible. Each has shown that the study of cultural process is largely dependent on the utilization of artifacts to convey information about the various subsystems of a culture. Hence, we are able to see how a culture, not just its technology, proceeds and changes through time. The ongoing interaction between artifacts and cultural subsystems, whether it be the picket fences of the 19th century Mormons in Utah or the gravestones of 18th century New Englanders, conveys knowledge about the entire culture.

There is little doubt that technology is of concern in material culture research. Its relationship to culture, however, has been more directly studied by historians of technology. They have examined all aspects of the field (engineering, art, invention) but have done so with the concern for "how things are done and made" (Daniels, quoted

from Leone 1978:194). This approach, while offering valuable insight into technological processes, rarely does little to aid in our understanding the overall cultural process of a society.

They are rarely concerned with technology as a social phenomenon. They usually deal with complex machines of the sort produced by the more recent phases of the Industrial Revolution. They are, as historians, concerned with the particular, not with the comparative nor the general. They are not cross-cultural nor, as historians, are they concerned with applying the goals of science to the study of technology. As a consequence, they have left most technology, including simple machines, outside their domain and thus deprived themselves of the temporal laboratory in which change could be examined. As technological determinists, most historians of technology have considered technology in and of itself, divorced from social and ideological concerns (Leone 1978:195).

In light of these criticisms, I approach my thesis with caution. The preponderance of my data concerning the evolution of field fortification forces a strong technological bent in its orientation. Nevertheless, technical study need not be relegated solely to the investigation of historical development.

Students of material culture recognized that fortifications can be regarded as artifacts and they can thus be subjected to the same types of analysis which artifacts have undergone after excavation (Babits 1980:1).

Insight can be provided by the analysis of the physical remains of defenses as well as the examination of those concerns shared by the military engineers who constructed them. The techniques of construction reflect traditional methods bound by practical concerns. They allow not only an under-

standing of "how things are done and made" but why "things are done and made".

While military technology and strategy played major roles in determining the technical features of the fortification, concerns for efficiency greatly influenced its application at particular sites. To those who directed fortification construction, effective utilization of time, money, and labor were noted to be of primary importance because such undertakings usually involved great monetary costs and intensification of labor. Efficiency was not only found to be an economic imperative but a determinant in the success or failure of a defensive work (Mahan 1850; Brackenbury 1888). The concept of efficiency has been discussed theoretically by several writers (Skolimowski 1965; Zipf 1949) and provides a good foundation upon which to base a theoretical approach.

Efficiency is of special interest in the study of two particular fortification sites. The first includes the Revolutionary War defensive works located along the Delaware River in Pennsylvania. The second site includes the Civil War fortifications built around Raleigh, North Carolina. While the characteristics of these works are largely dictated by the nature of the areas to be defended, they share many similarities in technical features as well as concerns of those in charge of their construction. In order to better understand the association between these two works and the common principles which guided field fortification construc-

tion, it is necessary that they be incorporated in a discussion of four areas:

- 1) The evolution of the field fortification from the late 17th century to the mid-19th century.
- 2) Factors influencing the evolution of the field fortification.
- 3) Historical background of Raleigh during the Civil War and the building of Raleigh's defenses.
- 4) Theoretical concerns and the evaluation of the defensive measures taken at Raleigh.

A brief discussion of the Philadelphia defenses in the first two chapters will provide considerable insight into some of the basic principles of field fortification construction at the time of the Revolutionary War. The subsequent, in-depth study and historical reconstruction of the Raleigh fortifications in chapters three and four will demonstrate the application of the same principles some 83 years later.

The historical reconstruction of the Raleigh fortifications requires not only a discussion of the techniques and principles which guided their construction but an investigation of their influence on the civilian population. To date, little research has focused on the defensive measures taken at Raleigh and that which has been conducted is of questionable accuracy. Although specific archival information is available on the fortification network there is "no single real description of them" (Babits 1984:1). The careful

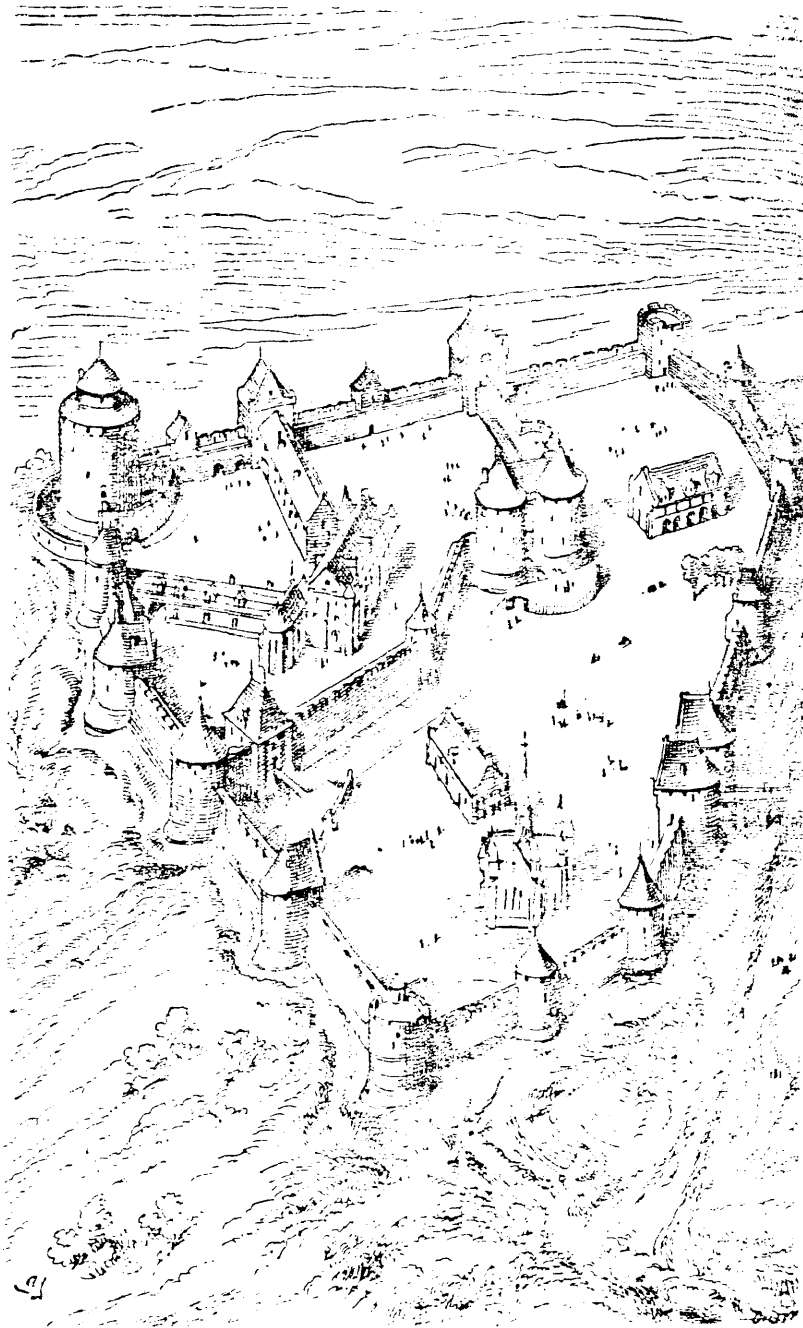
examination of extant documents, cartographic materials, and existing fortification segments provides valuable insight into a relatively unexplored, turbulent period in Raleigh's history.

CHAPTER I

THE EVOLUTION OF FIELD FORTIFICATION, 17th-19th CENTURIES

The pattern of fortification construction practiced during the second half of the 19th century was a technical art. It was an engineering feat based on several hundred years of experimentation; and in fact had its origins during prehistoric times (Fagan 1980). As one noted military engineer stated a century ago, "the principle is the same for the savage as for the most elaborately drilled and armed soldier of the nineteenth century; that being, the taking of cover from the enemy's fire" (Brackenbury 1888:2). Whether the cover consists of a wall of stone, a fallen log, or a mound of earth, fortifications have been part of warfare just as warfare has long been part of human culture.

The passage of time led man beyond the sole use of natural barriers for defense and he was gradually pushed into the realm of defensive creativity. The massive stone walls typical of Jericho (10,000 B.P.) eventually gave rise to the castles of the Middle Ages (Figure 1). Castles were very impressive structures that proved to be all but impenetrable. Their thick stone walls were built on elevated terrain and enclosed secure areas. This security encouraged the growth



**Figure 1. The 12th century castle of La Roche-Pont,
France (Viollet-Le-Duc 1876).**

of villages and towns within its boundaries. Serious problems arose, however, by the close of the 15th century. Changes in weapon technology enabled attackers to destroy castle walls and increased range made the enclosed community highly vulnerable. New defensive structures were essential.

Engineers began to design fortifications that were much more extensive than the confining defenses of the castle.

These new fortifications were far more elaborate than the old walls: they had outworks, salients, bastions, in spearhead form which permitted both the artillery and the armed infantry to rake the ranks of the attacking forces, from whatever side they might approach (Mumford 1961:358).

VAUBAN'S PERMANENT FORTIFICATIONS

Economy in construction was of concern to those engineers assigned the task of fortifying cities. The noted 17th century French engineer, Sebastien Le Prestre de Vauban was not only influenced by the basic design elements of the 16th century but was "economical of the money of the state" (Viollet-Le-Duc 1876:306). Many of his works incorporated pre-existing fortifications which, in turn, lessened monetary costs and necessary labor. In fortifying the town of La Roche-Pont, for example, he utilized extensively the bastions constructed earlier by Errand (Figure 2).

Vauban's defenses were greatly influenced by the 16th century Italian school. Vincenzo Scamozzi (1552-1616) contributed substantially to fortification design and was perhaps the premier authority on permanent defensive works at this

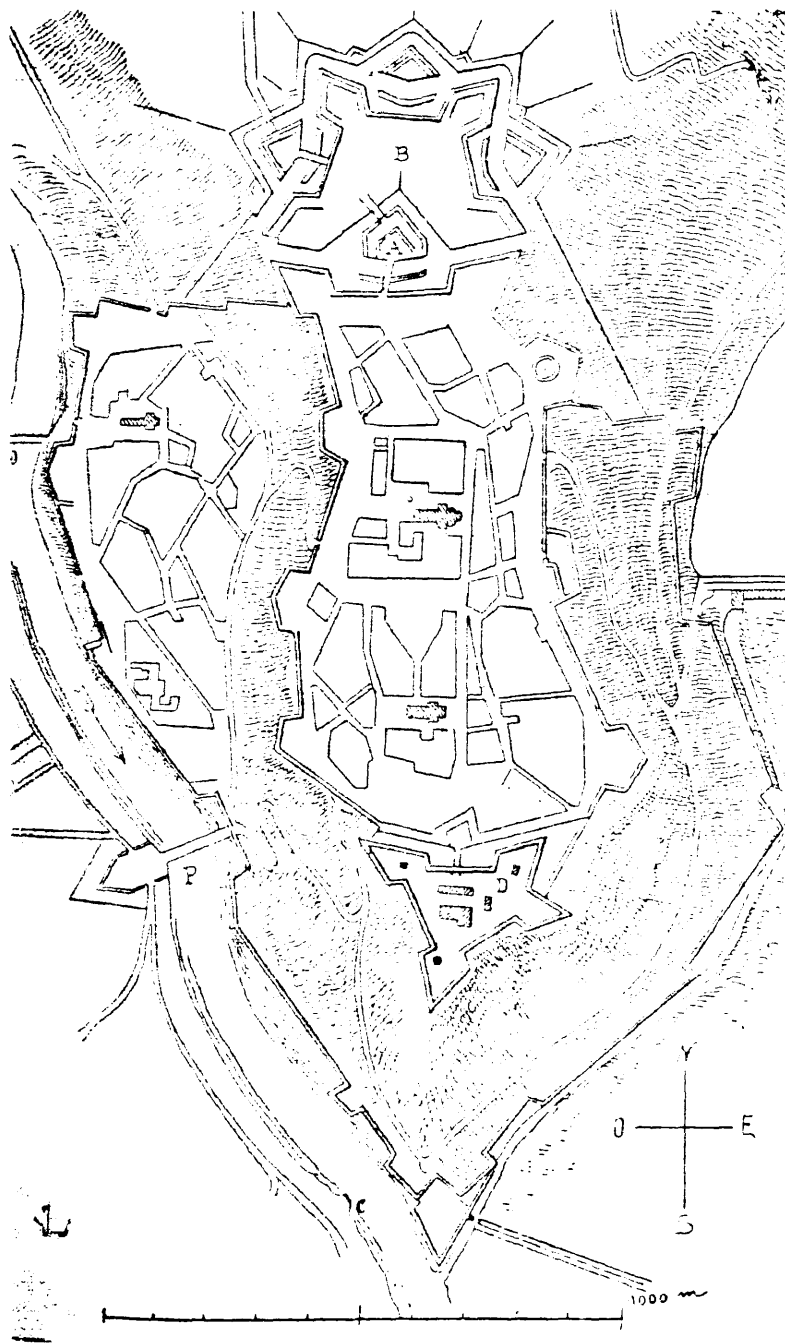


Figure 2. The 17th century town of La Roche-Pont as fortified by Marquis de Vauban (Viollet-Le-Duc 1876).

time. The works of Scamozzi and his contemporaries, however, were flawed by principles not understood until the 17th century.

What they had not yet grasped was the importance of outworks, in advance of the main rampart, the demi-lunes, ravelins, tenailles and hornworks of which Vauban made such skillful use (Bloomfield 1971:24).

Vauban took the basic design that had emerged a century before and elaborated upon it. His designs were more complex and the components of his fortifications were more distinct (Figure 3). "His great excellence as an engineer was shown in the skill with which he adapted the fortifications he planned to the defensive requirements of the site..." (Mercur 1888:46). Although skillful in his approach, he greatly increased the internal complexity of the work. This is seen in the description provided by Clarke:

The geometrical foundation of the Vauban systems was the bastion trace. Draw a polygon round the area to be defended, make of each a bastioned front, obtain saliency and a cross fire over the front of the ravelins. This was the foundation to which Vauban, in his so-called first system, added little. Supplement this trace by any number of counter-guards; place an independent reduit in every available angle; build high cavaliers to give simultaneous lines of fire; retrench everything retrenchable; throwout hornworks, crownworks, tenaillons, demi-tenaillons, to the front, thus indefinitely increasing geometric possibilities; finally, build a "citadel" in which most of the above artifices could be repeated inside the mainline, and one arrives at a fair idea of what may be termed the linear method of fortification (Clarke 1909:7).

Understanding Vauban's system can be facilitated by focusing on some of the major components which he utilized. The most noted element of the Vauban works was the large earthen mound.

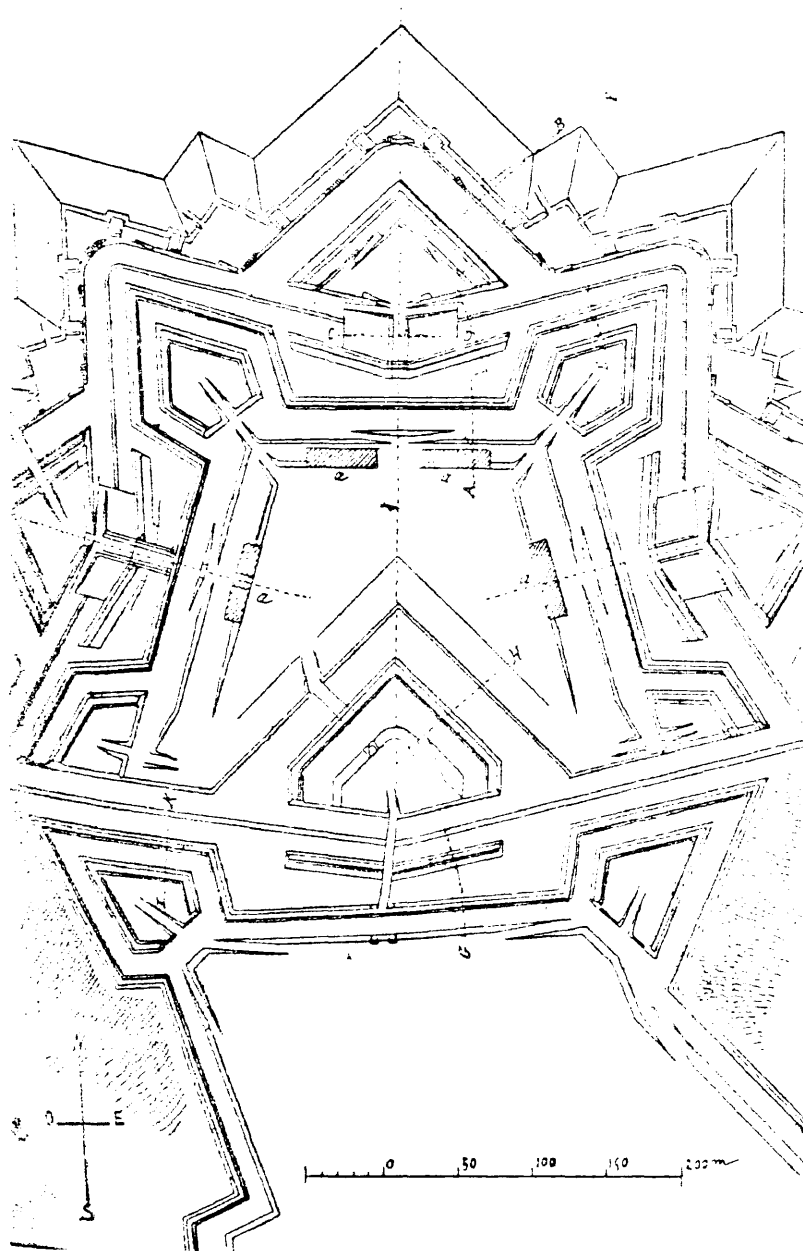


Figure 3. A detail of one of the outworks of the fortified town of La Roche-Pont (Viollet-Le-Duc 1876).

This was built in front of the main stone wall and constructed of earth excavated from the ground on its interior side. The wall and mound were usually of the same height thus creating a deep ditch. The exterior slope of the mound was referred to as the glacis and varied in the degree of its angle. Its main purpose was to protect the wall from artillery fire and, in conjunction with the ditch, make infantry assault as difficult as possible. A path was usually established between the base of the inner slope of the mound and the exterior edge of the ditch. This path or covered way allowed defending troops to assemble and quickly retaliate against attacking forces. If not actually engaged in a counter assault, defenders could nevertheless occupy

projections of the main wall and ditch combination. These redans offered the opportunity to bring cross-fire to bear on most points along the circumference of a fortress where attacks might be expected, and detached strongpoints on the weakest sides of the works, redoubts, further impaired the enemy's attempt to crack the defensive perimeter (Rothrock 1968:5).

A good example of Vauban's use of these basic components was the defensive works around the town of Lisle (Figure 4). He began work in 1668 after his designs were approved by King Louis XIV. Six thousand laborers spent six years building walls, ditches, and citadels --- all to the specifications of Vauban. By 1674, he reported that the majority of the fortress had been completed and that its inhabitants were engaged in the construction of their dwellings. The impressive nature of the defenses was in part due to the building complex

on the northwest side of the fortress.

The citadel was comprised of a pentagon fort with bastions and the usual detached works, all surrounded by water; and within the wall a great "place", 180 paces across large barracks, a Governor's house, a church, an arsenal, and other details -- the largest and most completely equipped citadel yet built in France (Bloomfield 1971:50).

The fortress of Lisle was one of several permanent defensive works that gave Vauban recognition from his colleagues as well as favor from his king. His works, however, have not been void of recent criticism. The 19th century French general Marmont wrote that Vauban "was more of an engineer than a general, and in making great numbers of fortresses he followed the bent of his own predilections" (Marmont quoted from Clarke 1909:5). He was involved in the construction of as many as 40 fortresses and all were built on one-third of France's frontier. Although Viollet-Le-Duc (1876) describes Vauban as economical in the building of his works, Clarke charges that Vauban's fortifications "entombed vast sums of money and certainly leave open to question whether the results obtained were proportionate" (Clarke 1909:5). He further states,

Vauban's conception of the use of fortification in relation to strategy was by no means justified by its results; while to the science in its narrower aspect, he contributed little that was of real value (Clarke 1909:5).

Simply stated, it was the opinion of Clarke and others that complication in fortification offered no advantage in defensive warfare.

FIELD FORTIFICATIONS

While the principles of the Vauban defenses have been criticized by some writers, they nevertheless had an impact on 18th and 19th century impermanent field fortification. In the United States, for example, D. H. Mahan wrote extensively on the various concerns of temporary fortification construction. He was a professor of engineering at the United States Military Academy and his book, A Treatise on Field Fortification (1852), was a basic manual for American military officers during the second half of the 19th century.

Colonel Charles C. Brackenbury, R.N., one of the foremost English authorities on temporary fortifications, wrote in a similar manner in his book, Fieldworks: Their Technical Construction and Tactical Application (1888). He discusses the various components of a well-fortified site and the importance of each component in its overall success. He notes that the main features of such a site include:

- 1) Some kind of cover which exists or can be constructed artificially, but must not be of such a size and construction as to hinder full view of the enemy.
- 2) Such a general shape of the work as will guard against flank attacks.
- 3) A citadel of some sort to prevent a partial capture of the work from being necessarily permanent.
- 4) Protection from enfilade fire by means of traverses.
- 5) Complete protection for all the garrison not wanted at the time for fighting purposes. This is secured by field casemates, which are generally arranged so that men can sleep in them (Brackenbury 1888:5).

Brackenbury discusses in detail these features and recreates the 19th century military engineer's "ideal" of a good field-work.

Construction begins after careful decisions are made as to the most advantageous placement of the works. Location is often dictated by topography, intended size of the defenses, and available construction materials. The size and extent of the defenses is dependent on the type of field artillery to be used by the enemy and the amount of time and manpower available. In addition to having a sufficient quantity of labor, it is necessary to base judgement on the mental and physical condition of the laborers. Brackenbury points out the importance of these two factors and notes that, if not taken into consideration by the commanding officer, they can result in the construction of weak defenses. Because the works operate as a system, failure in one part can lead to failure of the system as a whole.

The three basic forms which earthworks can take include closed, half-closed, and open. The three shapes are quite obvious, but they each have specific advantages and disadvantages. Closed works are characterized by thick parapets on all sides. These allow for temporary protection from artillery fire but generally make counterattack very difficult. "They are only used in isolated situations or for flanks of a line or reserved works" (Brackenbury 1888:38). Half-closed works only provide limited protection from enemy artillery and no

protection from rear attack. These works are usually dependent on rear artillery and infantry backup. If captured, they offer the advantage of allowing one's own artillery and infantry to attack from the rear --- the unprotected side. Open works are the easiest type to construct but offer virtually no flank protection. The troops are very dependent on the strength of their rear artillery (Figure 5).

The forms described above are very general and the actual shape of the fieldwork is dependent largely on the previously mentioned factors. There are, however, certain factors that are usually associated with large-scale fortification construction. A few of these include traverses, parados, and field casemates. Traverses are extended banks of earth and usually are not connected with parapets at their ends. These extensions are commonly found in closed works but are also found with other defenses. Their purpose is to protect the flanks and intercept enemy fire. One example of a large traverse is a parados. It is designed and situated to protect the rear of the work during attack from the front. Without this feature, it is doubtful that the fieldwork would be successful.

The success of the fieldwork is not only dependent on provisions made for the protection of the troops and artillery but also on provisions for sheltering inactive troops. Rest plays a vital role in battles of long duration. To accommodate fatigued troops, field casemates are often constructed (Figure 6).

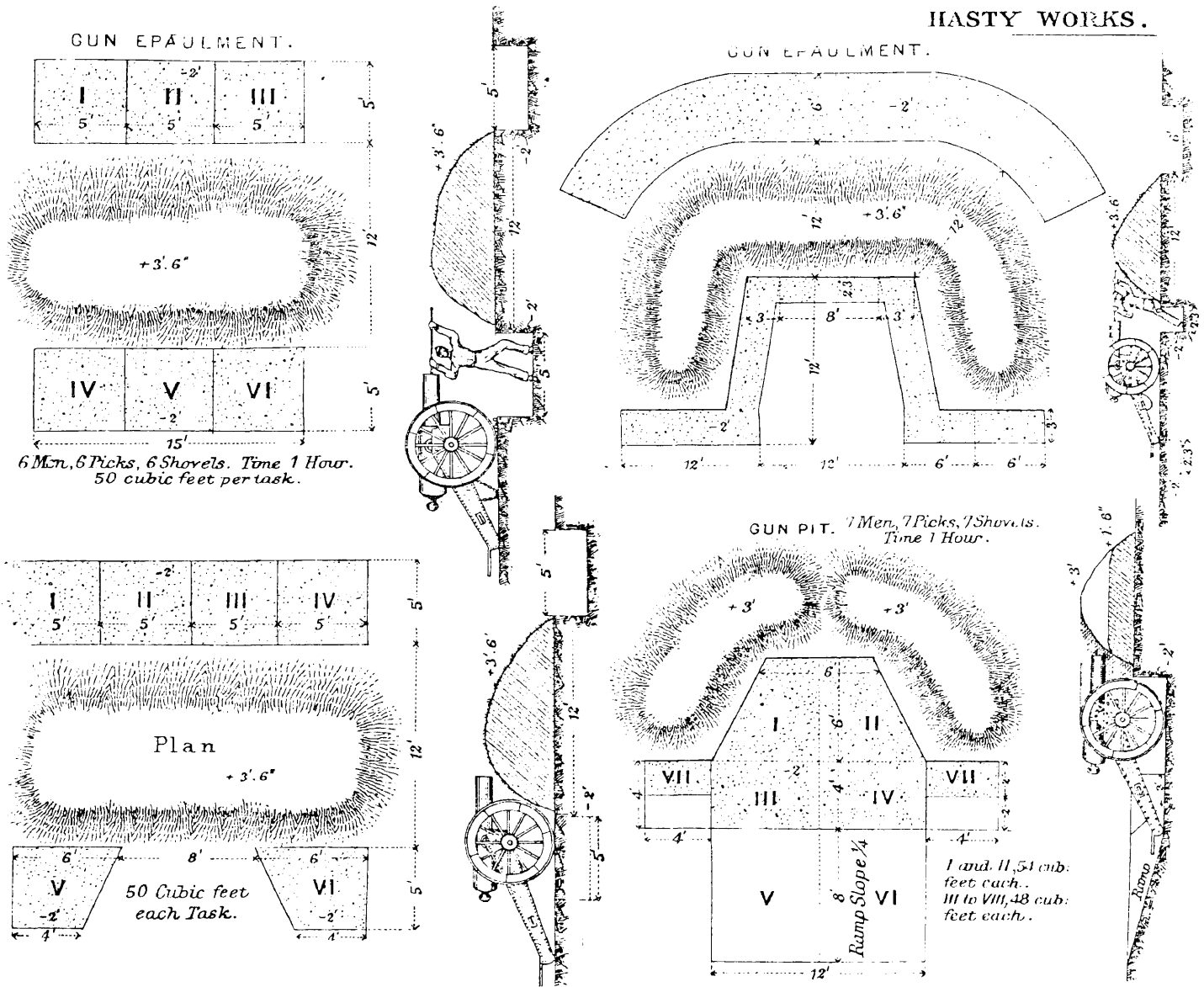
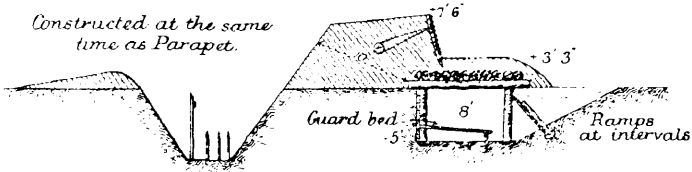


Figure 5. Open and half-closed works (Brackenbury 1888).

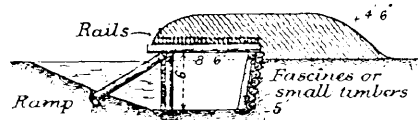
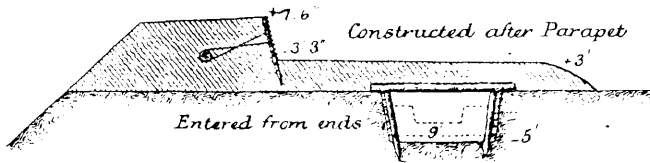
FIELD CASEMATES.

AND SPLINTER PROOFS.

Constructed at the same time as Parapet.



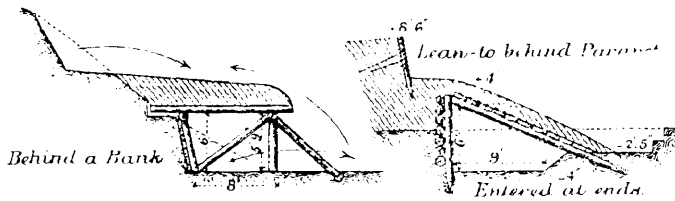
Constructed after Parapet



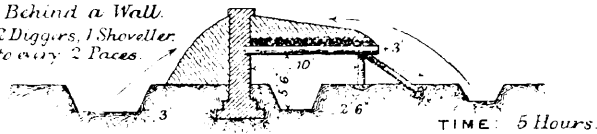
Double headed Rails.



Flat bottomed Rails.



Behind a Wall.
2 Diggers, 1 Shoveller
to every 2 Paces.



Scale 20 ft. to 1 inch.

TIME: 5 Hours.

ACTIVE GUN BLINDAGE.

BLINDAGE FOR GATLING.



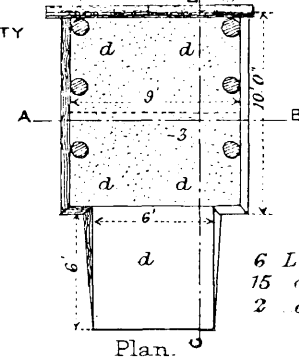
WORKING PARTY

5 Diggers
5 Helpers

TOOLS.

Picks... 5
Shovels 5
Axe... 1
Saw... 1
Auger 1

TIME
7 Hours

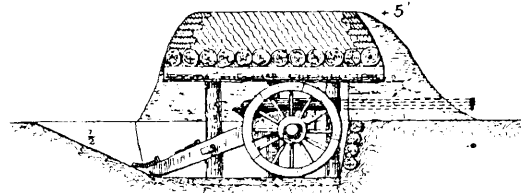


MATERIALS.

6 Logs 5' x 6" (diam.)
15 do 11' x 9" (diam.)
2 do 8' x 6" (diam.)

Plan.

Section C.D.



A similar Blindage could be made for field guns, but it should be 10 ft. wide and allow space for recoil. 20 Men 8 Hours.

For passive Gun Blindages, merely to place the Guns in safety see various text books.

Figure 6. Typical field casemates of the second half of the 19th century (Brackenbury 1888).

While these bombproof covers can serve their purpose, they are usually built in limited numbers. They are an elaboration of the shelter trench and require a great deal of time and labor to adequately construct. Brackenbury states that "it is well to think twice or thrice before occupying a defensive position which needs to be so strengthened, and which may carry with its fall the capture of the whole army" (Brackenbury 1888:39).

Another important aspect of the successful fortification is the use of obstacles. These vary in degree of effectiveness but all are intended to slow the advance of the enemy. Prior to laying obstacles, it is necessary to clear as much territory around the defenses as possible. This includes all types of foliage that could be used as cover by the attacker. Obstacles are then laid out, often in a concentrated manner. Those commonly used include cheveaux-de-frises, fraises, abatis, and palisades (Figure 7). Cheveaux-de-frises are pointed spikes that are driven through a beam. Often constructed out of available timber, these spikes present a formidable barrier. They are generally placed well in front of the fortification ditch. The ditch is usually v-shaped and thus prevents the congregation of enemy troops below the line of fire. As an additional obstacle, an abatis is usually added. This is usually a small tree that contains a protrusion of sharpened branches. Fraises are also sharpened spikes or small posts that are set in the bottom of a frontal trench. In

OBSTACLES.

WIRE ENTANGLEMENT.

ABATIS.

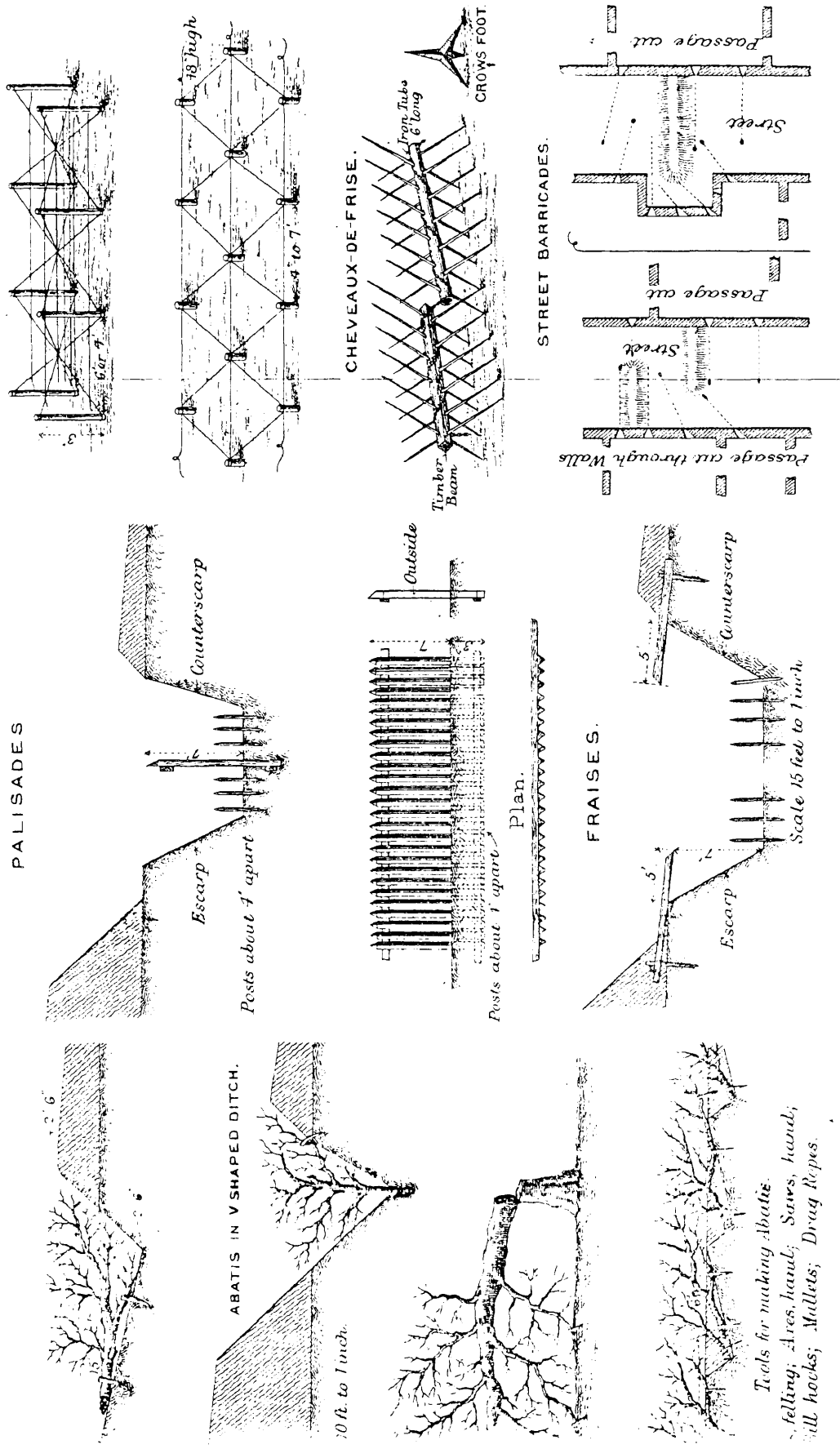


Figure 7. Obstacles -- abatis, palisades, fraises, and cheveaux-de-frise (Brackenbury 1888).

addition to the base of the trench, they may also be set horizontally into the rampart. If time allows, a series of sharpened posts can be placed along the interior of the fortification. The resulting palisade provides a good obstacle to infantry assault but is time consuming in its construction.

The obstacles and features that have been described are often directly associated with closed or half-closed works. They may also be associated with less complex works known as shelter trenches (rifle pits). Of all the fieldworks of which Brackenbury has knowledge, he favors the shelter trench. It can be constructed in a short period of time and yet be very effective (Figure 8).

It is not intended to be an obstacle in itself. Shelter trenches should begin with the shortest unit of time allowed to construct the minimum of cover, and be then developed, if required, through the forms of more protective shelter trenches up to that of the field parapet with its ditch (Brackenbury 1888:30).

In addition to the obvious advantage of constructing this simple fieldwork is the disadvantage it gives to the enemy. It has no frontal ditch which can offer quick refuge to an attacker and thus eliminates the need for flank defense.

The simple trench shelter offers another distinct advantage in that a line of "communication" can be established. This term refers to the presence of an exit within the works that will allow a hasty retreat or a rapid counterattack. Brackenbury states that:

SHELTER TRENCHES.

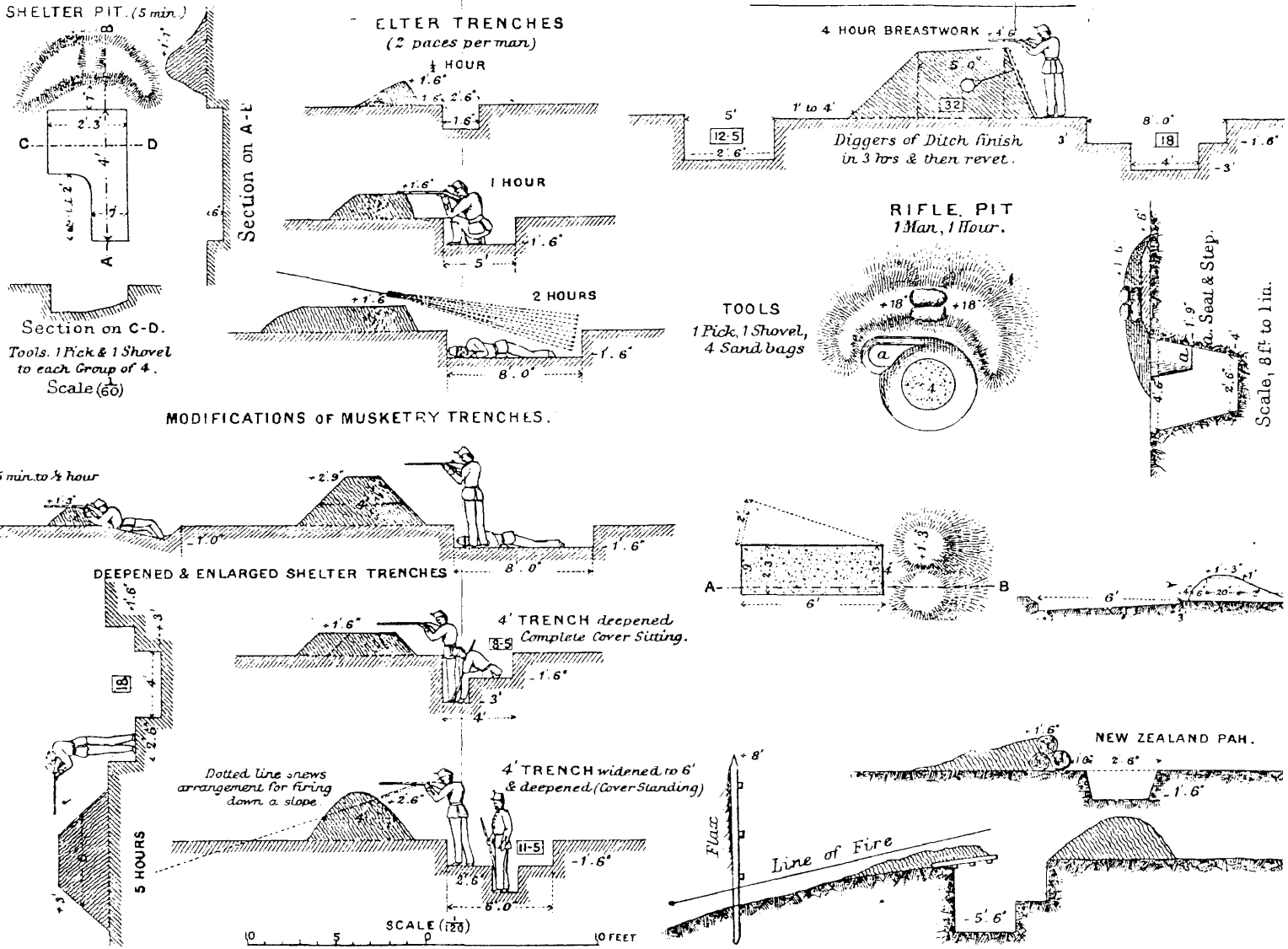


Figure 8. Shelter trenches (Brackenbury 1888).

the whole intention of fortification, as of tactics and other branches of the art of war, is not so much to kill numbers of the enemy while saving our own side, as to produce the greatest effect of moral depression on the survivors of the enemy and put our own troops in the highest spirits. A long continuous defense will never do this (Brackenbury 1888:6).

Brackenbury states that allowing proper communication is essential "because the tendency of all works, whether field or permanent, is to teach habits of inactivity which can soon become fatal" (Brackenbury 1888:6). If simplicity succumbs to elaboration and such components are neglected, then the success of the fieldwork will be in question. "Beware of being led into the expenditure of too much time and energy" (Brackenbury 1888:32).

THE AMERICAN DEFENSES OF PHILADELPHIA

The technical aspects of 19th century fieldworks were of advanced engineering design that offered great advantage in defensive warfare. As mentioned above, the success of the works was contingent on the satisfaction of certain design requirements. It is interesting to note that these requirements did not emerge during the second half of the 19th century but were known to military engineers during the Revolutionary War. Evidence of such knowledge is best seen in the work of Worthington C. Ford. His book, Defenses of Philadelphia in 1777 (1897), is a compilation of documents that provide a record of the Councils of War held by Washington. These documents contain war-related information; part of which concerns the building of defenses around Philadelphia.

On May 31, 1777, Washington wrote to Governor Patrick Henry of the expected sailing of a large fleet of the enemy -- estimated at a hundred sail -- from New York. What General Howe's immediate object was could only be conjectured; but it is believed that he had one of two purposes: either to possess the Hudson River or to attack Philadelphia by way of the Delaware (Ford 1971:1).

Washington suspected that Howe's aim was to attack Philadelphia. He therefore solicited advice from his general officers on how best to fortify the city.

Suggestions for the defense of the city focused primarily on the building of fortifications at strategic points along the Delaware River or strengthening those already in existence at these locations. These points included Billingsport, Derby's Creek, Red Bank, and Fort Island (Figure 9). Comments and opinions on the vulnerability of these locations was the main content of those responses sent to General Washington. There was also correspondence between generals in reference to the preparations necessary at these locations. These are important in that they contain significant comments on both American and British fieldworks. General Washington, for example, wrote Colonel Christopher Green:

Sir,
I am led to believe from the conversation I have had with Lieutenant Colonel Green, that you have made Fort Mercer impregnable against an assault; and that nothing is to be feared but from regular approaches and shells -- to guard against the first, it would be found necessary to have some out works, which time may, possibly allow you raise -- to secure the garrison against the second, some Bombproofs (casemates) should be constructed -- The first you can easily do, but how far the other is practicable I know not, for want of competent knowledge of the place -- its extent -- I would suggest to you, however, by way of quare, whether caverns could

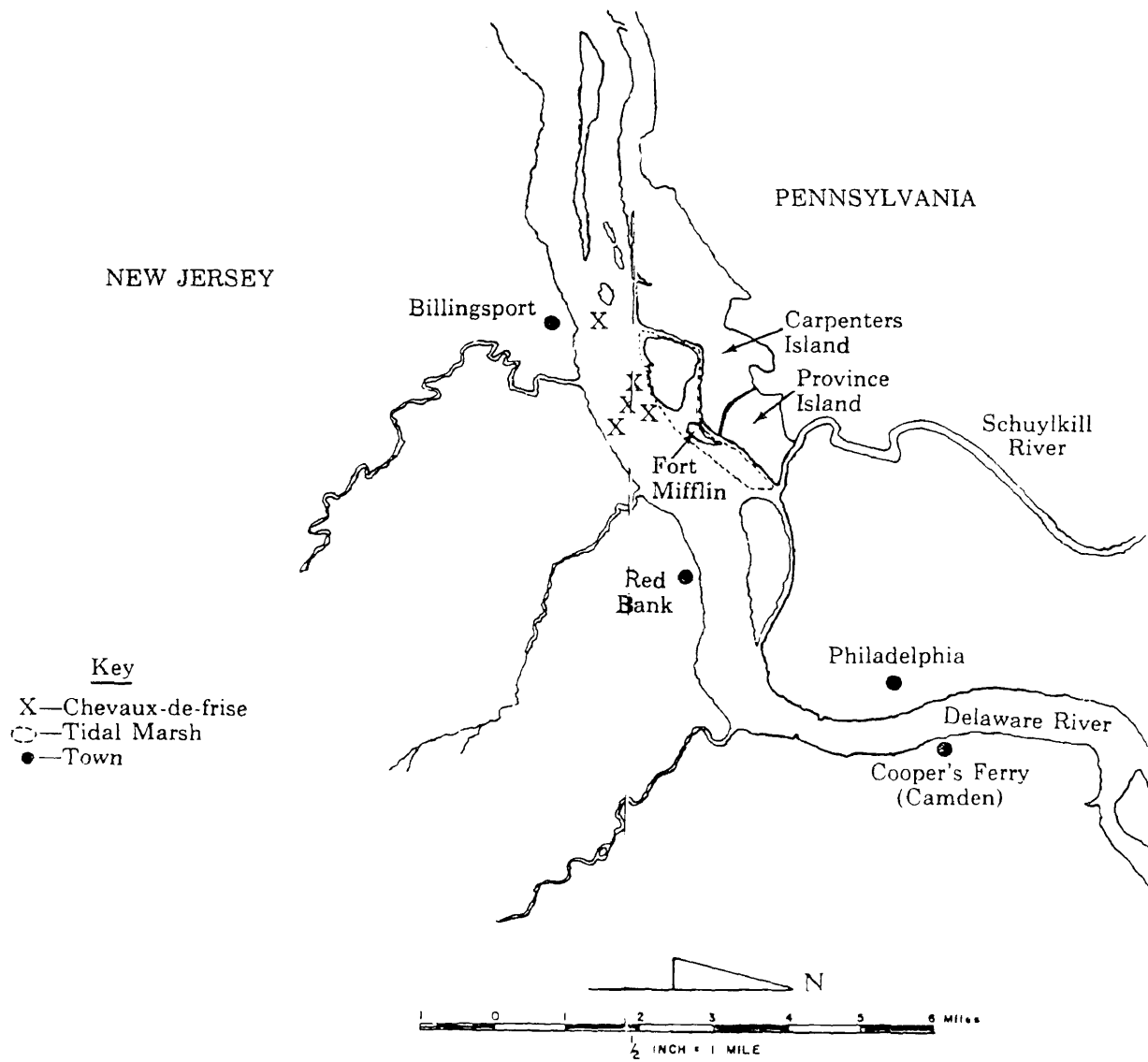


Figure 9. Location of major American fortified positions on the Delaware River.

not be cut out of the Bank below the work, and supported (the earth) by Pillars, would not be the quickest, and most effectual method -- If this should be found to answer, all your men, in case of a Bombardment, might be concealed in them, except such as should be necessary for guards (Washington quoted from Ford 1971:81).

Washington's brief description of Fort Mercer is supplemented by a reference to a fort on Hog's Island. Du Coudray, Washington's engineer in charge of the defenses of Philadelphia, states that

the fort where this battery lies is very bad, being inclosed, only on two fronts, by one palisade with bad loopholes, and very ill flanked; but as the enemy can Land there, only with chaloupes, it may Resist Long time, even in this weak situation, with six or seven hundred men to guard it; specially if the army was not far off (Du Coudray quoted from Ford 1971:16).

In addition to having an understanding of structural design within the interior of the defenses, officers had knowledge of numerous obstacles that could hinder an assault. An American officer stated that

The Enemy have enlarged the upper battery opposite the Fort, we this morning discover 5 Embrasures, masked as yet with Fascines -- it is probable that they will open at once -- their prospect seems to be, to knock down our palisades, and storm our west front between the two block houses. To cover our palisades on this side we have applied to General Varnum to furnish us with fascines, which we shall place on the Summit of the bank to serve instead of earth, which is not to be had -- I don't know whether we shall be able to procure the Fascines (Journal quoted from Ford 1971:99).

Palisades were popular obstacles but officers also noted the use of pickets, abatis, and cheveaux-de-frises. The cheveaux-de-frises were not only used as obstacles on land but placed across shallow rivers. They temporarily blocked the passage

of ships and hindered the major means of transporting troops, ammunition, and provisions.

Obstacles were but a part of a complex pattern utilized during the Revolutionary War. Both British and American engineers were not only aware of the function of the various fortification components but were concerned with the most efficient use of labor and time. Many of the officers directly questioned the practicality of building and strengthening certain defenses. There was a prevailing attitude of caution throughout the correspondence against the unnecessary use of money, time, and labor (Ford 1971). The Congress and the Continental Army had none to spare. One of the most outspoken proponents of such a policy was Major General Nathaniel Greene. In his reply to General Washington, he stated that he was against extensive development of any fortifications at any of the strategic points along the Delaware. To complete such works (at just one of the location) would require the labor of a large number of troops, not to mention the number needed to garrison the works. He estimated the need of at least 1200 men at Billingsport alone and stated that

there have been prodigious sums of money expended at that place and people have taught to expect great security from its strength. To abandon it at this time might alarm their fears, and give the dis'posed a handle to censure the leaders of the people for subjecting the Continent to such fruitless and unnecessary expense. Although these reasons urge strongly for holding the work, yet those that offer themselves for abandoning it, operate more forcibly with me (Greene quoted from Ford 1971:8).

He noted that the present works at Billingsport lacked two major features -- casemates and a proper line of communication. The fort would last a very short time if it came under siege and it would be difficult, if not impossible, for the garrison to retreat. Similar problems existed at Red Bank and Derby's Creek.

Greene favored the type of fortification advocated by Brackenbury a century later. He proposed that simple trenches be dug for use by infantry and half-moon parapets be thrown up for artillery. The advantage to such defenses was that they could be quickly constructed at various points and would require limited troops. These defenses could be easily abandoned and would in turn be of little strategic value if captured. If extensive fieldworks were constructed, and eventually captured by the enemy, grave consequences could result. The well-armed British could easily supply these works with cannon. Greene conceded that all forts along the Delaware would eventually fall under British siege. He concluded that "the country cannot be conquer'd and held in subjection but by garrisons; it should be our policy, therefore, to have as few as may be" (Greene quoted from Ford 1971:11).

CHAPTER II

THE IMPACT OF WEAPON TECHNOLOGY AND WARFARE STRATEGY ON THE DEVELOPMENT OF FIELD FORTIFICATION

The engineering principles which guided field fortification construction during the 18th and 19th centuries were the contributions of a number of early engineers, Vauban having been the most celebrated. These principles have an irrefutable link to weapon technology and warfare strategy. Clarke (1909:6) states that

fortification and tactics have but one and the same basis in all ages, and that is the power, in the widest possible sense, of the weapons of the attack and defense. The only scientific fortification is that which enables the defender to use his weapons to the best advantage, while minimizing the potency of the weapons of the attacker.

SEVENTEENTH CENTURY WEAPON TECHNOLOGY

As discussed earlier, the 17th century fortresses of France had a number of complex geometrical elements incorporating massive earthen walls and extensive ditches. Contrary to the criticisms lodged against these defenses, their validity is somewhat restored when one reviews the nature of 17th century warfare.

Benjamin Franklin suggested to Charles Lee, in a letter dated February 11, 1776, that

pikes could be introduced and I would add bows and arrows. These were good weapons, not wisely laid aside;

- 1st Because a man may shoot as truly with a bow as with a common musket.
- 2ndly He can discharge four arrows in the time of charging and discharging one bullet.
- 3rdly His object is not taken from his view by the smoke of his own side.
- 4thly A flight of arrows, seen coming upon them, terrifies and disturbs the enemies' attention to their business.
- 5thly An arrow striking in any part of a man puts him "hors de combat" till it is extracted.
- 6thly Bows and arrows are more easily provided everywhere than muskets and ammunition (Franklin quoted from Esper 1965:382).

It is interesting and perhaps ironic that two centuries prior to this correspondence, the firearm had replaced the longbow and by the 17th century it had become firmly established as the principal military weapon. The irony of this situation can be understood by examining the inadequacies of the weapons and the difficulties it placed on offensive warfare.

The major firearm of the first half of the 17th century was the matchlock musket. Although Neuman (1967) notes the use of the flintlock as early as 1550 in Europe, the matchlock was considered by the soldier to be more reliable. This preference required the acceptance of many inconveniences.

These consisted of:

- (1) protecting the weapon (powder) from moisture;
- (2) keeping matches burning in the presence of an enemy and thus, often betraying position by light, smoke, and odor;
- (3) poor range (100 to 200 paces) and slow loading meant that fire could be maintained only by a deep formation --- six men deep, more or less (Spaulding, Nickerson, and Wright 1925:497).

Likewise, artillery weapons of this period presented

major logistical problems as well as serious hazards. It was not unusual for a battery of ten, 24-pounders to require as much as twelve tons of shot and six tons of powder for one day's operation. Transporting large quantities of munitions with relatively few guns lessened the advantage of having such weapons for use on the battlefield. The imposing dangers of artillery also hindered its effective use. The often poor quality of the powder and its slow burning would "more often than not leave smoldering powder in the gun after the round had been fired. Before reloading it was imperative to swab out the gun thoroughly, lest the next charge pre-ignite, an occurrence frequently fatal for gunners" (Rothrock 1968:5). The smoldering powder also tended to glaze the barrel of the weapon thus making the bore diameter uneven. Balls were not fired smoothly greatly decreasing their range and accuracy.

A great deal of the 17th century was characterized by the use of weapons that lead one to question the reasoning for their acceptance. They were generally unreliable, dangerous to the user, and often dependent on acceptable weather. Such complications were not characteristic of the longbow. The superiority of this weapon over the firearm was recognized by many individuals well into the 18th century. Most critics wrote extensively during the period of its replacement by the firearm. Sir John Smythe (1590) was typical of those who pointed out the many shortcomings of the new weap-

on. To counter this wave of criticism, advocates pointed out some of the advantages of the firearm. Sir Roger Williams, for example, stated that "munition that belongs unto the bow men, are not so commonly found in all places, especially arrows, as powder is unto other shot" (quoted from Esper 1965:386).

The replacement of the longbow in the English army has been recently studied by Thomas Esper (1965). He concluded that the replacement was due to a number of factors not necessarily limited to the military establishment. The key to understanding one of the principal reasons is found in the statement of the 16th century writer Humfrey Barwick. He states that "any qualified archer was expected to shoot a dozen arrows in one minute at a man-sized target two hundred and forty yards away -- and hit it with all twelve" (quoted from Esper 1965:388). While somewhat exaggerating his point, he nevertheless uses the term "qualified". The majority of 17th century English soldiers were not trained in archery. The onetime national sport had declined in popularity and given way to "unlawful games". In essence, the average soldier lacked the years of experience necessary to be a good archer.

If one considers the manner in which armies were raised in Elizabeth's reign, when quite often vagabonds and the most wretched were pressed into service, it is understandable that the soldiers were generally poor archers and their weapons, poorly used, inferior to firearms (Esper 1965:391).

WARFARE STRATEGY IN THE 17th CENTURY

The weapon technology of the 17th century greatly influenced the warfare strategy of the period. The inadequacies of the firearm and logistical problems of the artillery were coupled with armies that could not be easily mobilized. More time was spent maneuvering armies into favorable positions than was actually spent in battle.

Field battles were usually a matter of tacit agreement between opposing commanders to essay a trial of force where each thought he saw a margin of victory, unless one's forces had -- as only rarely happened -- attained a position that forced the enemy to defend against an advance at any cost (Rothrock 1968:8).

Commanders could literally not afford to be reckless in their engagements. Troop replacements in the field were few and munitions slow in coming.

Armies often maintained a series of fortified cities under their control. Their massive defensive enclosures offered a safe haven for beleaguered troops and the viable economy of the city usually allowed quick resupply of needed materials. Extended occupation usually led to siege warfare by the enemy. This was the preferred type of engagement by opposing forces, each believing that their position held special advantage. "To Louis XIV, to his war minister Louvois, and to his chief engineer Vauban, war of position appealed with special fascination" (Rothrock 1968:10). This was in part due to the prevailing cautious attitude of military leaders and their failure to commit their forces to battle

on the open field. This fascination was also the result of the obvious advantages of the 17th century fortress. Direct infantry assault was rarely attempted. The only means by which a fortress could be taken was through the construction of siege lines. A special engineering feat in itself, such lines enabled both artillery and infantry to achieve closer positions to the defenses. Vauban, noted for his contributions to defensive warfare, had extensive knowledge of such operations. He warned repeatedly that siege lines exposed the vulnerability of defenses and that no fortress "could ever be designed that would be impregnable to a determined and well-supplied enemy" (Rothrock 1968:10).

THE EMERGENCE OF THE FIELD FORTIFICATION

The end of the 17th century was characterized by certain changes in military organization that were to have a profound influence on 18th century warfare. These changes included an increased number of professional soldiers and greater structuralization within the military establishment. The once large, uncontrolled mass of infantry was refined into precise units and characterized by rigid formality. It was recognized that, if infantry were to be effective on the open field, organization was essential. This was influenced by the tactics of war at the turn of the century. Military leaders had long known that "maximum fire power was the desideratum; with the weapons of the day the dense line was the formation that gave it; a new system of command to handle it could not be

improvised; hence "linear tactics" (Spaulding, Nickerson, and Wright 1925:531). Such tactics had one major principle and that was for each soldier to maintain the "line". This battle formation required not only rapid deployment from the line of march but a great deal of discipline under fire.

Better organization and new tactics were conditions which "led to the extended use of fortified lines -- not only chains of fortresses like Vauban's, but systems of field entrenchments to cover a whole province: (Spaulding, Nickerson, and Wright 1925:532). They usually connected a series of fortified posts and were often themselves protected by barriers incorporated into their design. The French (1702), for example, used water inundation to protect their lines along the Dutch frontier. Similar barriers were used in building extensive works in the upper Rhine Valley during the first decade of the century.

"LINEAR" TACTICS, TRADITIONALISM, AND THE AMERICAN EXPERIENCE

Although the advantages of good field fortification were realized during the first half of the 18th century, tactical concerns continued to be influenced by offensive warfare. The "linear" method retained its popularity, although adjustments were required to lessen the defender's advantage. To counter the deadly effects of volleys fired from fortified positions, regular infantry depended on an advanced guard of skirmishers. These troops did not proceed in line formation but rather in a dispersed manner. They engaged the enemy and allowed wing formations of the regular troops to assume flank positions. Reserve mounted troops often followed the rapid advance of

regular infantry and exploited the broken ranks of the enemy's formation. This was facilitated by massing artillery for the assault and, prior to the arrival of cavalry, blasting the enemy with caseshot (Falls 1961).

The true advantage of defending a well-fortified site was perhaps not fully appreciated because of the continued limitations of the firearm. Improvements such as the flintlock over the wheellock and earlier matchlock did little to increase range or rate of fire. The rifled musket could not totally rectify these inadequacies. It was plagued by an "even slower rate of fire than the smoothbore and was more fragile. Armies, therefore, rejected rifles for general use and issued them only to a few specialists units" (Ross 1979:24).

Eighteenth century firearms and tactics each contributed to the perpetuation of military tradition on the European battlefield. Flexibility and elasticity had become acceptable in tactical maneuvers but officers continued to engage in battle utilizing line formations. This tactic had been largely confined to Europe and had not been adequately tested on distant battlefields. One such example of its use was in the 1755 expedition of General Edward Braddock in the United States. According to Spaulding, Nickerson, and Wright (1925:569)

the general's experience had been in European wars of the Marlborough type, and he could not see that in the Indians he had to meet anything more serious than European light troops, which were helpless against a line of battle. His dispositions when nearing Fort Duquesne showed no lack of caution or skill. There was no distant reconnaissance but there was a proper use of advanced

guard and flanking parties. The enemy was discovered in plenty of time, and the advanced guard, commanded by Colonel Thomas Gage, formed line and repulsed the first attack handsomely. But the Indians spread around the flanks and commenced a steady individual fire. The troops showed discipline and steadiness, but could find nothing to attack. The expedition ended in utter disaster.

The British experience in the United States did not end with the Indian wars but rather was continued in the American Revolution. This conflict brought together opposing forces which differed greatly in the number and quality of troops. The superior number of British land forces were well-organized, disciplined, and backed by a large navy. Supplied with adequate weapons and munitions, British commanders had no reason to alter the tactics to which they were accustomed. They were no longer fighting the Indians but rather the Americans and the French. It was not surprising that their enemy, likewise, was pressed by tradition to engage in the tactics of war suitable to Europeans.

It was soon recognized by the Americans that victory over the British could not be achieved by traditional warfare methods. Linear tactics favored those who were superior in number, well-trained, and better equipped. Thus, fortifications and individual fire became important tactics in the American army. Strong defensive positions reduced the advantage given to a superior number of enemy but could only do so for a limited period of time.

Indefinite occupation of fortified positions was impos-

sible. A good example of this principle was seen in the American occupation of Philadelphia's defenses. Several of these fortifications were originally constructed by the British prior to the Revolution. In 1771, a sum of 15,000 pounds was granted for the defense of the city by the Pennsylvania Assembly. A portion of this money was used to purchase a small island located approximately eight miles down the Delaware River. British Captain of Engineers John Montresor supervised militia and civilian laborers in the construction of a large redoubt on this island. Three years later, Penn noted in his January 20, 1774 address to the Assembly that

you will, on Enquiry, find that the work, so far as it has been executed, is done in a masterly Manner; and that Materials to a considerable Value are on the Spot, ready to continue it as soon as the season will admit (Penn quoted from the Pennsylvania Archives 1935:7079).

Following Penn's assessment of the defenses, he provided a partial itemization of expenses entailed from fortification construction. Numerous workmen are noted as having received payment for their labor on the defenses. While payments were made to some individuals, Penn states that attention is being directed as to "how much is yet in Arrear to the workmen" (Penn quoted from the Pennsylvania Archives 1935:7079).

The defenses of Fort Island fell into the hands of the Pennsylvania militia in 1775. Extensive improvements were carried out and

the completed fortification, called fort Mifflin, covered the southern tip of the Island, which was little

more than an easily-flooded mud flat. The fort had stone walls on the south and east sides, and log palisades and earthen embankments enclosed the rest of it (Lender 1979:14).

In refurbishing this fortification and other defensive works, the Americans also utilized civilian labor. This was favorable to many of Washington's engineers. His chief engineer, in reference to the defense work at Billingsport, stated that

if the Government intend to unite all their efforts in finishing this fort, I would propose to hire instead of militiamen, workment by the day, which after exact calculation of all expenses, will cost incomparably less, I believe, will work a great deal more, give far less trouble to those who conduct the works, and not consume such an immense quantity of tools of all kinds (Du Coudray quoted from Ford 1971:44).

The strengthening of the defenses on Fort Island and Billingsport were obvious attempts to deny the British a major means of access to Philadelphia. Members of Washington's Council of War were convinced that the city would be attacked by the British Navy; probably by siege. If the British could not be stopped down river, then American control of the city would be lost. American forces had become dispersed along the river defenses and were not in position to defend landward approaches. Consequently, on September 26, 1777, the forces of General Charles Cornwallis approached the city by land and took possession unopposed. American strategy then turned towards holding the river defenses and preventing British supply ships from reaching port. Superior British firepower placed the defenses under heavy siege and the works were gradually abandoned. On November 15th, Fort Mifflin was

taken and by the 23rd Washington conceded in a letter to Congress that "the enemy are now in possession of all the water defenses" (Washington quoted from Oberholtzer 1912:269).

The abandonment of the defenses was the result of the inability of the Americans to maintain a continuous defense under siege. This action was a reflection of the limited value of fortified sites under certain conditions. Sometimes, however, conditions allowed for great success. Prior to the abandonment of Fort Mercer on November 30th, its garrison defeated a large number of Hessian troops. Their attack was launched against a fort that was deceptive in its appearance. The first enemy column crossed the abandoned outworks "and unconscious that they had been designedly abandoned, they thought in the excitement of the first surprise that the entire fort was their own" (Stryker 1901:18). Remaining Hessian forces approached the defensive works and it was then that the garrison, concealed within the inner entrenchments, opened fire. The impact of the fire from the loopholes along the mainline was tremendous and angles created by the defenses allowed devastating crossfire on the Hessian flank. The defeated Hessian forces suffered a large number of casualties, including the officer who claimed that he would take the fort with no mercy for its defenders.

WEAPON TECHNOLOGY AND WARFARE STRATEGY IN THE AMERICAN CIVIL WAR

The developments in 19th century weapon technology had a profound influence on the extensive use of fortification

during the Civil War. Its impact can be seen not only in the variety of firearms and artillery produced by domestic and foreign contractors, but by certain shared features which proved the weapons superior to those of earlier periods.

Perhaps the most important feature to gain acceptance was the rifling of firearms. Rifled muskets had been issued to special troops during the Revolution but were not acceptable for standard issue. The popular smoothbore musket continued into the 19th century and was the principal shoulder weapon stocked in Federal arsenals by mid-century. During the early months of the Civil War, the smoothbore was one of several "obsolete weapons called back into service. This was true even with flintlocks, especially in some Confederate units" (Lord 1965:242).

The rifle became an effective infantry weapon after the development of the modern bullet, a conical projectile with a hollow or brass base which expands to take the grooves in the barrel. The percussion cap was an improvement over the flintlock. Breech-loading increased the rate of fire and made it possible to load from a prone or running position. The muzzle loader hung on for a time because it was easier to manufacture and existing stocks of muskets could be converted into rifles, but all of these inventions eventually enabled the infantry to deliver more fire at longer ranges. This out-moded Napoleonic artillery tactics, which had smashed at the enemy's tight formations with case shot (which had the same effect as later shrapnel) from outside musket range (Ropp 1962:162).

Advances in 19th century artillery owed much to developments introduced in earlier periods. For example, breech-loading was introduced as early as the 15th century and straight grooved rifling in the 16th century. Breech-loading artillery

pieces were used to a limited extent by Federal and Confederate forces during the war. Ordinance officers, however, tended to prefer the use of the muzzle loaders. This preference continued throughout the 19th century despite the benefits offered from such an innovation. Rifling of cannon was more readily accepted but, as in the shoulder weapon, was not universal until the second half of the 19th century. Many smoothbore pieces were used throughout the war, especially by the Confederates. A disadvantage in using the rifled piece was that it had

to be served more carefully than the smoothbore. Rifling grooves were cleaned with a moist sponge, and sometimes oiled with another sponge. Lead-coated projectiles like the James, which tended to foul the grooves of the piece, made it necessary to scrape the rifle grooves after every half dozen shots, although guns using brass-banded projectiles did not require the extra operation (Lord 1965:24).

In addition to rifling artillery with twisted grooves, several other advances were made which increased the range and accuracy of the cannon. Falls notes that

their transformation was due to rapid and continuous improvement in a number of respects. The gun itself, instead of being cast, was made of wrought iron bands from the tunnions (the projections which rested on the carriage) to the breech. With stouter guns more powerful propellants could be employed, and by 1861 one was available in the form of nitroglycerine. The other type of explosive used by artillery, the charge in the shell, was also increased in violence (Falls 1961:64).

These developments had a major impact on the tactics of war practiced during the mid-19th century.

In addition to the advances in weapon technology, sev-

eral other factors influenced the tactics or strategies of war adopted by the Confederate and Federal armies. Military tradition, for example, was maintained by the leading officers of the opposing armies. Many were graduates of West Point and their training based on French tactics adopted in the previous century. Ross (1979) and Ropp (1962) have noted not only the popularity of French drill in the United States army but also of French tactics of troop deployment in the field. The frontal assault of strategic areas was the principal means of attack recognized by commanders during the first half of the war. It was not until 1863 that a major shift in tactics took place. Wave after wave of attacking infantry was no longer an effective maneuver in the field. More often than not, such Napoleonic tactics proved fatal. "The skirmishing formation was now the normal tactical order" (Ropp 1962:162). This was in part due to the increased utilization and availability of more effective weapons and basic differences in the opposing armies.

The Confederate forces essentially fought a defensive war. "Because they could not hope to conquer the Northern States, their problem was to resist conquest. In other words, to tire the Federals out, and force them to abandon the war" (Fuller 1961:101). In order to accomplish this, the Confederates depended a great deal on strong fortified positions. Successful attack against such positions usually required a superiority in troops of 3 to 1. This lessened the advantage

given to the superior number of Federal forces. Eventually, the extensive use of defensive works characterized both sides and ended the traditional tactics of assault. The skirmish formation was adopted on a large scale and had implications far beyond its restrictive use on the battlefield. Loose-knit raiding parties attacked the economic base of the Confederacy. Gradual destruction and capture of numerous port and railroad facilities shook the foundation upon which the South rested. The tactical advantage of maintaining defensive position could not continue indefinitely; especially if severed from the economic centers of resupply.

CHAPTER III

THE RALEIGH FORTIFICATIONS

In order to adequately study the Confederate fortifications of Raleigh, North Carolina, it is necessary to investigate the circumstances leading to their construction. The task can best be accomplished by "recreating" Raleigh during the early 1860s and focusing on its role as a Confederate capital during the Civil War. The investigation is facilitated by documentary evidence which describes the conditions in Raleigh during the war and provides insight into the defensive measures taken to protect the city.

ECONOMIC CONSIDERATIONS

Throughout the Civil War years, North Carolina and its capital played an important role in supplying the Confederate army with the various goods and services demanded by war. Raleigh, like the capitals of the other southern states, was the primary economic and administrative center that maintained the state as a productive member of the Confederate States of America. Raleigh was surrounded by various mills, virtually all of which produced goods needed in the war effort. One such mill, Whitaker's Mill, was located on Crabtree Creek and had been in operation since its construction in 1777. Dur-

ing the war it was primarily used in producing black powder. This was sold to the Confederate government for \$1.75 a pound. Another important mill, known at various times for its production of lumber, wheat, and wool carding, was Yates Mill. It was located on Yates Pond, south of Raleigh.

At Raleigh and Fayetteville were paper mills; and there were thirty-nine cotton factories and seven wollen mills. These made yarn and cloth, and throughout the state, hand looms and spinning jennys came into use by those who could obtain them. Wooden shoes, pikes, caps, and powder were also made at Raleigh (Ashe 1925:65).

Governor Vance encouraged home manufacture of everything that was needed for the war. He made sure that all North Carolina troops were well supplied with clothing, shoes, and blankets. "The Confederacy, on one or two occasions, drew on the depot at Raleigh for clothing for other troops" (Curry 1900:81). Throughout the war, Vance made available to the soldiers of other states quantities of shoes, blankets, and clothing.

Along with the many industrial sites that were located just outside the town and important businesses within, one cannot overlook the importance of the railroad system. Two important railroads connected with Raleigh in 1861 and the same extensions exist today; only the names have changed. From 1861 to 1865, the North Carolina Railroad connected Raleigh with the towns of Greensboro, Goldsboro, and other parts of the state (Figure 10). By 1896, the railroad system had been renamed as Southern Railroad and is called the same today. The Weldon and Gaston Railroad also connected with

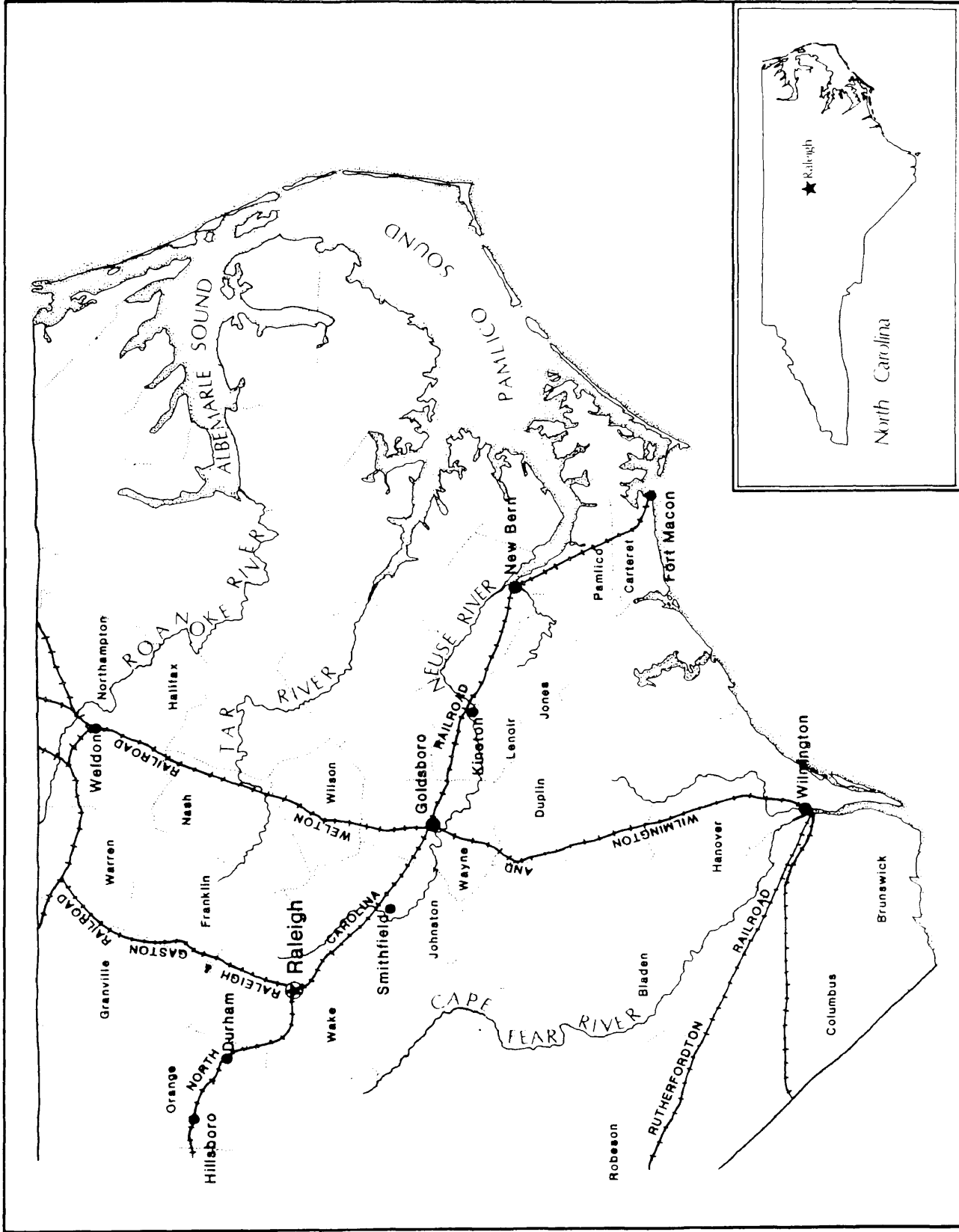


Figure 10. Map of North Carolina (1861-1865) showing extension of railroad system from Raleigh to other North Carolina towns (Corbitt and Wilborn 1973).

Raleigh during the war years. It entered the town from the south and continued, parallel to the North Carolina Railroad for some distance, in a northeasterly direction. After the war, the railroad was renamed as the Raleigh and Gaston Railroad. The same extension is known today as the Seaboard Coast Line. It is interesting to note that so few changes have taken place since the Civil War in the railroad systems connecting directly with the capital. It is important historically with regard to the strategic location of a section of fortifications constructed around Raleigh.

The railroads were the most efficient means of transporting large numbers of soldiers and vital supplies to Confederate troops. Without this network, Raleigh would not have been an asset to the southern cause. The railroads not only carried soldiers and supplies out but wounded in. Raleigh was the site of the state's first Confederate military hospital. Approximately three different hospitals were established in Raleigh during the war. One hospital was located in the newly constructed buildings of Peace Institute (1863), known today as Peace College, which was located in the northern part of the town not far from the tracks of the Weldon and Gaston Railroad. A second military hospital was established west of town in the area that is today occupied by the state fairgrounds. The third hospital was of less importance than the previous two and was located in southeast Raleigh.

By the end of 1862, the citizens of Raleigh were making

virtually every effort to carry their share of the burden of the war. They were encouraged to conserve what little was available and to do without those things that were not absolutely necessary. As the war dragged on, this was not a difficult task. Prices skyrocketed and people were left to survive only on the essentials. The Ladies Aid Society of Raleigh attempted to provide relief for a great number of impoverished citizens. Its efforts were hindered by the exorbitant costs of many items. A treasurer's account with the Ladies Aid Society list the purchase of the following items:

Raleigh, N.C.	1864	March	13	100	lbs	Sugar	\$20	1b	\$2000.00
		"		1	Keg	Lard	84	lbs	\$10 1b \$840.00
		"		1	lb	Tea	\$150.00		(Coker 1966).

Calico sold for \$30 a yard; a pair of cotton socks for \$10; a white straw hat for \$20; and a bushel of meal for \$25. Adding to their economic difficulties, citizens were asked to make food contributions to military training camps outside of town.

As the war progressed, Federal soldiers also made themselves felt by raiding towns not far from the capital. One such raid took place at Rocky Mount on July 29, 1863. The Battle's Cotton Factory was burned and storehouses were destroyed. The governor and the citizens of Raleigh realized that the capital could be a prime target for a raid by Federal cavalry.

Cavalry raids are getting to be serious things to the people of the Confederacy -- especially to the quiet inhabitants of this goodly city, who don't know whether

they will be permitted to sleep in their own beds to-night. The raid on the W and W Railroad, at Warsaw has put our people to thinking, and, we hope, to acting also. There is no way to protect the country against these raids but to put every man able to bear arms on a war footing. Hence we hope that the legislature will pass at once, the "Raid Bill", or something like it, by which every white male person, physically able to handle a gun, from 16 to 50 or 60, may be enrolled and kept ready to assemble for home protection at a moments notice.

This is an emergency -- this city is in peril -- and those who have as yet found excuses for doing nothing, who have not lifted a finger for the Confederacy, in any way, have now the chance to show their pluck or cowardice, and he who falters now makes himself infamous for all time (North Carolina State Archives 1863g:1).

In response to this threat, Governor Vance "officially" ordered the construction of breastworks and gun emplacements to be constructed in July of 1863. There are many arguments as to when the initial construction began. According to an article entitled "Our Defenses", which appeared in the August 22, 1863 edition of the Raleigh Registrar, construction of the fortifications began approximately in May of 1862.

It was stated that

during the last 15 months immense labor has been bestowed upon the permanent and temporary fortifications of our city, and as common sense would dictate, attention was first bestowed upon the points which could first be capable of strong resistance, or which were most exposed to attack (North Carolina State Archives 1863c:2).

North Carolina and Virginia formed a military agency known as the Department of North Carolina and Virginia. The agency was begun in 1861 and was concerned with the defense of strategic locations in each state. "The purpose of the

department was not only to assist in defending the area between the James and Potomac rivers, but also to make effective the blockade of the coast of Virginia and North Carolina" (Spraggins 1941:163). In order to prevent Federal troops from entering the states by way of the coast, the construction of fortifications with gun emplacements were needed. Such defenses required a large manpower resource and being a period of war, the states did not have an available number of white males to carry out the task. Blacks, however, were relatively abundant and manual labor was not alien to them. Several months later, an act was passed that required all slaves between the ages of 18 and 45 to register in the same manner as the free black.

Upon requisition from the president of the Confederate States, the government of Virginia would impress slaves to work on fortifications and other labor necessary for defense of the state. No more than 10,000 could be used for more than 60 days or 90 if locals refused to let their slaves work. Sixteen dollars a month was paid to the master and the slave received soldier's rations, medicine, etc. All expenses were paid by the government of the Confederate States of America (Spraggins 1941:173).

A similar mobilization of black labor existed in North Carolina. The most well-known fortifications were constructed at Wilmington and involved the labor of approximately 2,000 slaves (Figure 11). After the fortifications had been completed and Federal lines were moving deeper into North Carolina, Governor Vance stated in the January 4, 1865 edition of the Weekly Standard:

Whereas, the long expected attack upon our only remaining seaport is now about to be made, and our state is also

Recd 27/63 of M. A. Bledsoe's receipt
received at Dallas & receipt to be taken to the
proper officers at Wilmington to work on
Fortifications

Nathan J. J. J. J. J.
C. J. J. J. J. J.

Figure 11. Receipt given to Mr. Moses A. Bledsoe for the use of three of his slaves in the construction of the fortifications at Wilmington, North Carolina (Coen, McGrew, and Morris 1981).

likely to be invaded at other points by an enemy to whom mercy and civilization are alike unknown and unregarded; whereas all the organized forces of the state already ordered to the front may still be insufficient to roll back the tide which threatens us from our doors, a fate horrible to contemplate. Now, therefore I Zebulon B. Vance Governor of the State of North Carolina, relying upon the loyalty and devotion of her citizens, do issue this my proclamation, commanding all good people, whether by law subject to military duty or not, who may be able to stand behind breastwork and fire a musket, of all ages and conditions, rally at once to the defence of their country and hurry to Wilmington (North Carolina State Archives 1865:3).

Regardless of Vance's bold speech, Wilmington eventually fell into Federal hands.

Three years before the fall of Wilmington, fortification construction had begun at Raleigh. On December 20, 1862, an act was ratified that "authorized the Governor to employ slave labor in erecting fortifications and other works" (North Carolina State Archives 1862:3). As in Virginia, male slaves between the ages of 18 and 45 were required to be available for labor in the construction of defenses.

CONSTRUCTION OF THE RALEIGH FORTIFICATIONS

The construction of the Raleigh fortifications began in May of 1862. The engineering officer in charge was Lieutenant Colonel Henry T. Guion. Guion served with the 10th Regiment North Carolina State Troops (1st Regiment North Carolina Artillery). He had risen from the rank of Captain to Major on April 13, 1863 and five months later was promoted to Lieutenant Colonel. Guion's previous engineering experience had been primarily in the eastern part of the state.

Prior to his assignment at Raleigh, he directed the construction of the fieldworks at Greenville, Goldsboro, and Fort Macon.

Lieutenant Colonel Guion and his assistant superintendent of works, James Holister, were allotted approximately 263 slave and 23 free black laborers (Figure 12). Payroll records indicate that the laborers came from 15 different North Carolina counties and each worked an average of 30 to 35 days (Figure 13). The owners were paid \$1.00 a day per slave which they allowed to work. Available records indicate cost of the labor totalled \$8036.50 (Coker 1966).

Fifteen months of construction produced a "small ring of earthworks" that extended approximately four miles (Olds 1915:2). They were of simple construction and typical of those adapted to mid-19th century warfare (Figure 14). Guion, himself, referred to the works in July of 1863 as being "thrown up" around the city (Coker 1966). Despite their relative simplicity, they were not constructed in a haphazard manner. The careful placement of limited works at strategic points followed the traditional principles which guided field fortification construction. The application of these principles was evident in the construction of American Revolutionary War defenses and clearly guided the building of the Confederate defenses nearly 100 years later around the city of Raleigh. The fortification plans for Raleigh were briefly

1163
Moses A. Bledsoe Esq.
Fortifications around Raleigh, Aug 26
Dear Your Bro. Samuel, Esq
discharged from the courts this morning.
James D Hollister Esq Esq

Figure 12. A note to Moses A. Bledsoe from James D. Hollister concerning the use of his slaves in the construction of the Raleigh fortifications (Coen, McGrew and Morris 1981).

Pay Roll of Laborers on the Entrenchments at Raleigh, from Davie County.

THE SUBSCRIBERS HEREBY ACKNOWLEDGE TO HAVE RECEIVED OF _____ THE AMOUNT DUE FOR LABOR PERFORMED ON THE ENTRENCHMENTS AT RALEIGH, IN THE YEAR 1863. THE SUMS ANNEXED TO THEIR NAMES RESPECTIVELY, BEING

NAMES OF LABORERS	NAMES OF OWNERS	Commenced Work	Ended Work	Days Employed	Rate per Day	Amount Paid	SIGNATURES	WITNESSES	REMARKS
Agnes	Samuel Smith	28 th Aug	9 th Oct	6	37	222.00			
Agnes	A. Bellman			6	37	222.00			
Agnes	A. S. Low			6	37	222.00			
Agnes	A. C. Low			6	37	222.00			
Agnes	A. S. Payne			6	37	222.00			
Agnes	C. T. Linnard			6	37	222.00			
Agnes	M. H. Ward			6	37	222.00			
Agnes	E. S. Mearns			6	37	222.00			
Agnes	W. S. Carpenter			6	37	222.00			
Agnes	A. Mearns			6	37	222.00			
Agnes	C. S. Mearns			6	37	222.00			
Agnes	C. S. Mearns	1 st Sep		4	25	100.00			
						132.00			
						354.00			

I certify the above Roll, with the time and amount charged for, to be correct.

H. L. ... *... in Charge*

Figure 13. Pay roll account record of slaves from Davie County, North Carolina used in the construction of the Raleigh fortifications (Coker 1966).

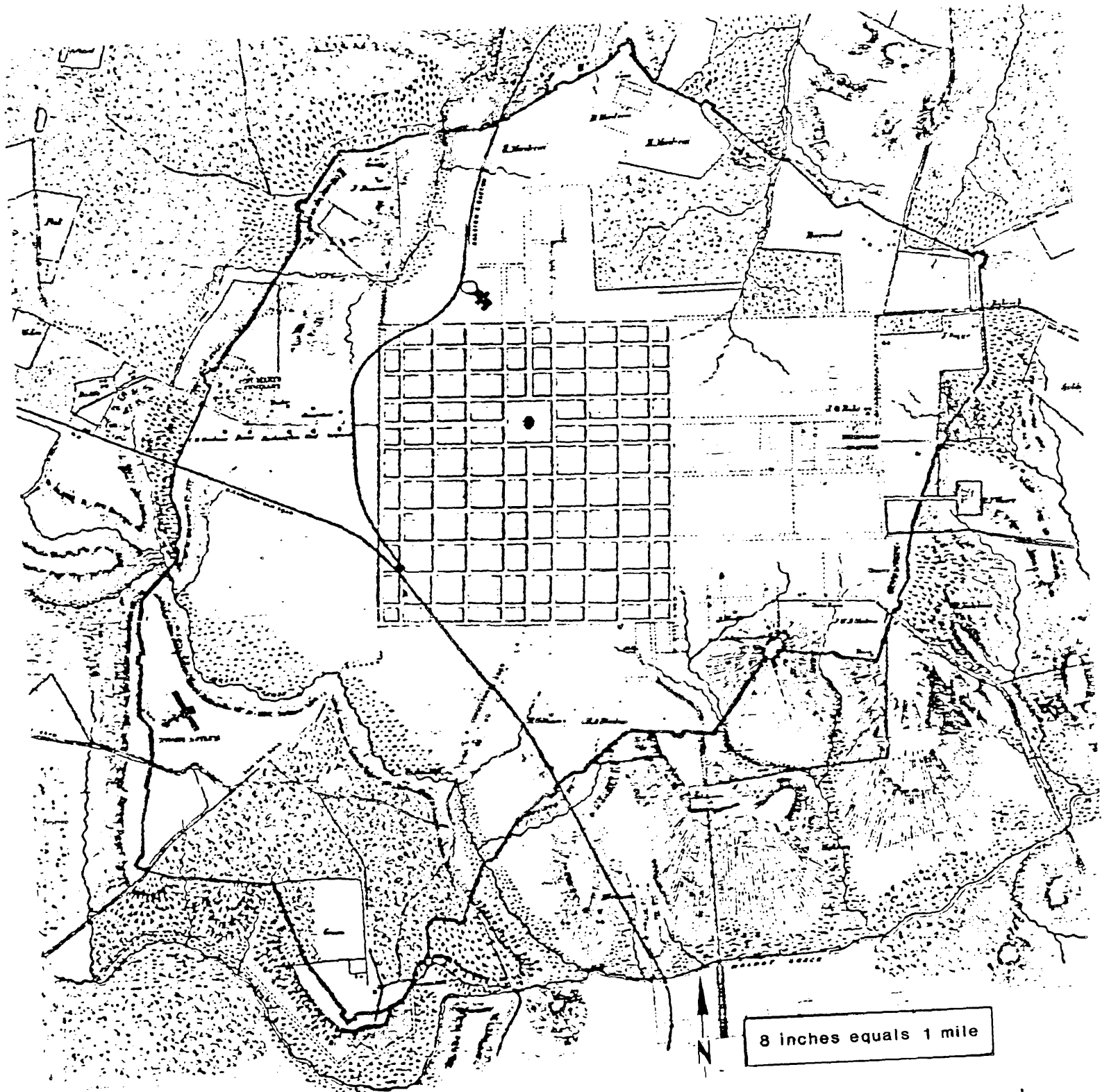


Figure 14. The Confederate fortifications of Raleigh, North Carolina as they appeared in 1865 (Coker 1966).

summarized in a local newspaper article entitled "Our Defenses" which stated that

in so extensive a system of works it is difficult to bring every portion up at once to the same standard of strength; during the last 15 months immense labor has been bestowed upon the permanent and temporary fortifications of our city, and as common sense would dictate, attention was first bestowed upon the points which could be capable of strong resistance, or which were the most exposed to attack. The next thing to be done was to connect these points, and the next to increase the capacity of defense of every part to the greatest possible extent. The second part of the work was long since effected, and the third is now in steady progress, nor do we expect that it will be suspended so long as the enemy defer their attack, whether the delay be one month or two years (North Carolina State Archives 1863c:2).

The type of fortification constructed at points considered most vulnerable to attack was the shelter trench. The construction of the trench at selected points was the first stage in fortifying Raleigh. As many as five separate trenches were independently dug during the initial phases of construction. Although the simple trenches were little more than rifle pits and provided minimal cover, they could be constructed in a short period of time. Simultaneous trenching at numerous locations around the city insured proper defensive strength for the primary stage of fortification construction.

The second phase of construction was the elaboration of the shelter trench into more protective forms of works. They were developed into half-closed parapets suitable for gun emplacements. According to Olds (1915:2) these were strategically placed around the city and were strengthened with timber. There were 18 such strengthened positions and each had

developed from a basic form of shelter trench. The original five trenches and subsequent gun emplacements formed the major outward projections of the fortification system. Additional gun emplacements were added during the third phase of construction.'

Upon completion of the works at the most strategic locations, efforts concentrated on joining the defenses. Trench lines connected the major gun emplacements with smaller secondary emplacements built into the line. The trenches were approximately eight feet wide and five feet deep. There was no ledge left at the base of the interior slope of the breastwork and trench. The stiff, clayey soil of the piedmont region allowed this to be removed without fear of the fortification collapsing (Brackenbury 1888:23). The top of the breastwork, or its superior slope, was four feet wide and flattened, as was common (Figure 15). The flat surface facilitated the movement of workmen along the line of works as well as aided the defender. The plane surface which topped the breastwork enabled the defender to direct his line of fire toward the enemy without betraying his position. The fortifications were constructed so that they would "look as much as possible like the natural ground in the neighborhood, so as to afford as bad a target as possible" (Brackenbury 1888:23).

Close examination indicates that their placement was influenced by several factors. First, the defenses were



Figure 15. The top of the breastwork showing the trench line on the left with a noticeable drop in elevation on the breastwork's outer (western) face.

designed to enclose as much of the North Carolina Railroad as possible. Of primary importance was the protection of the two railroad depots and associated warehouses. The careful placement of the eastern and southern defenses allowed the greatest distances possible between these defenses and the storage/control areas. Second, all the defenses were constructed on high ground. This is clearly evident when the line of works is traced on a modern contour map of the city (Figure 16). Landmarks such as Devereau Meadow, St. Mary's College, and Dorthea Dix Hospital occupy land characterized by a noticeable drop in elevation immediately to their west -- outside the defended area.

A more dramatic drop in elevation is evident south of the city. The distinct advantage of defending high ground in this area supports the reasoning behind the concentration of gun emplacements in the south/southeast extension of the works (Olds 1915:2). A third factor which influenced the strategic placement of major segments of the defenses was the probable direction from which the city would be attacked. It was apparent early in the war that the Federals would attempt to capture the port city of Wilmington and take gradual control of the entire North Carolina coast. As Federal forces became more firmly established in the coastal region, raiding parties would infiltrate the state's interior. With raids on a number of eastern North Carolina towns, it was logical to assume that Raleigh would be a prime target.

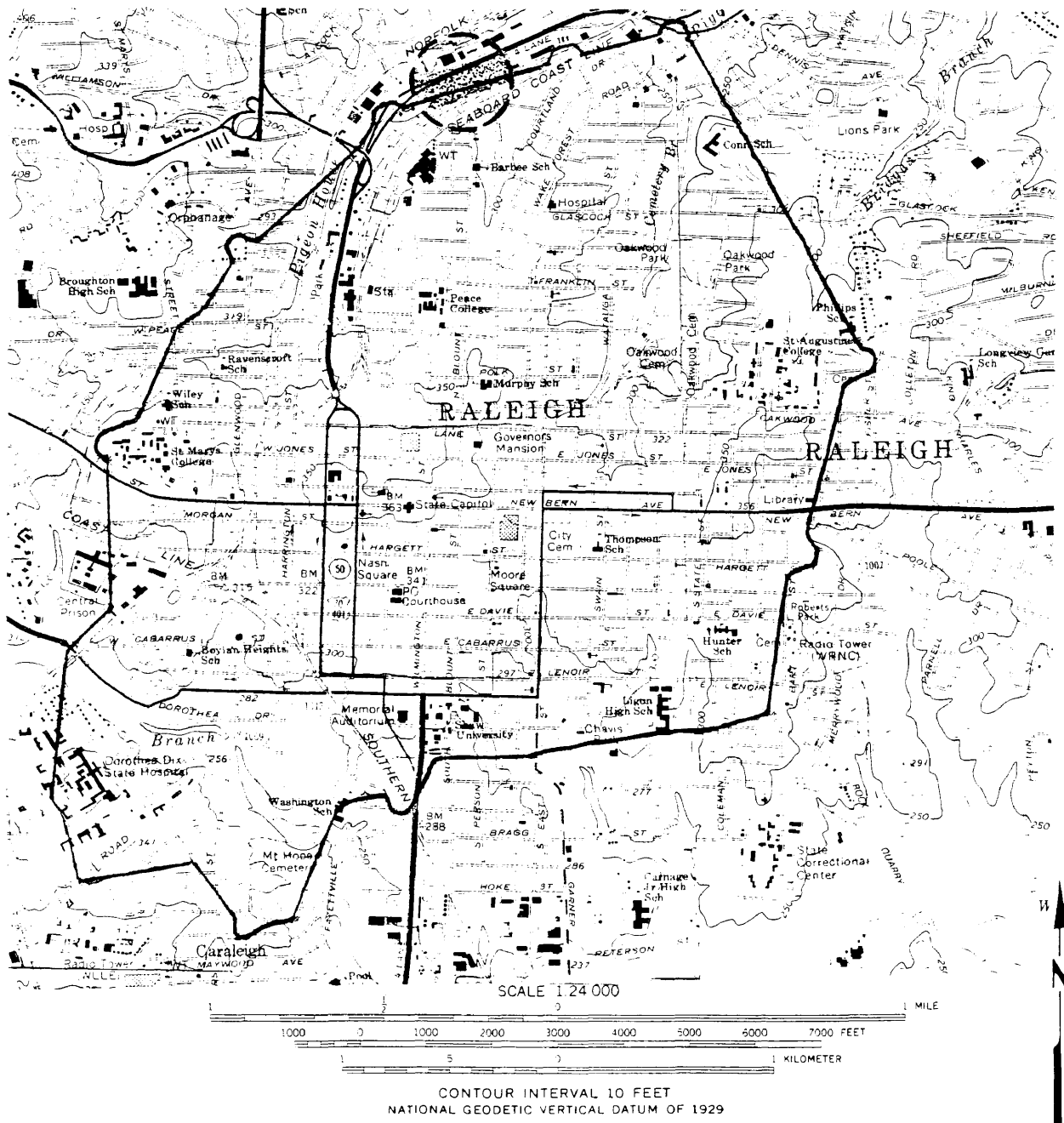


Figure 16. A contour map of the city of Raleigh, North Carolina. The stippled area within the circle locates the segment of fortifications identified in the 1936 Federal Writer's Project and examined in this research. The fortification segment lies immediately east of the Downtown Boulevard.

Therefore, close attention to the placement of the eastern and southern defenses was imperative. They were extended to prevent quick access to the city by way of the major roads. Allowing adequate distance between these defenses and the economic sectors of the city was a major concern. Examination of the structural aspects typical of the Raleigh defenses can best be seen in surviving remnants (Figure 17). Perhaps the most well-preserved section of the fortifications is located adjacent to the tracks of the Seaboard Coast Line in the northern extension (Figures 18 and 19). This line of works was first studied in a 1936 Federal Writer's Project. It was reported in a local newspaper in reference to this project and this particular section of works that

The clearly perceptible earthworks abutting on the west side of North Blount Street, a few hundred feet southeast of the three story community house of Pilot Mills, may be taken as a starting point for tracing the line of the fortifications. Following Blount Street north to the railroad tracks and turning southwest across the track and open ground a few hundred feet to the edge of the wood and following the clearly defined embankment about 400 yards to the bridge on Fairview Road across from Pigeon House Branch. These two sections of old breastworks are about one fourth of a mile apart, and between them no connecting link is now perceptible (North Carolina State Archives 1936:1).

The 1936 investigation located these two major extensions with less perceptible remnants found extending to the south of the city. Of the two extensions identified, only one remains clearly discernable today. It is the network that runs adjacent to the railroad and Downtown Boulevard and extends to the bridge on Fairview Road (Figure 20).

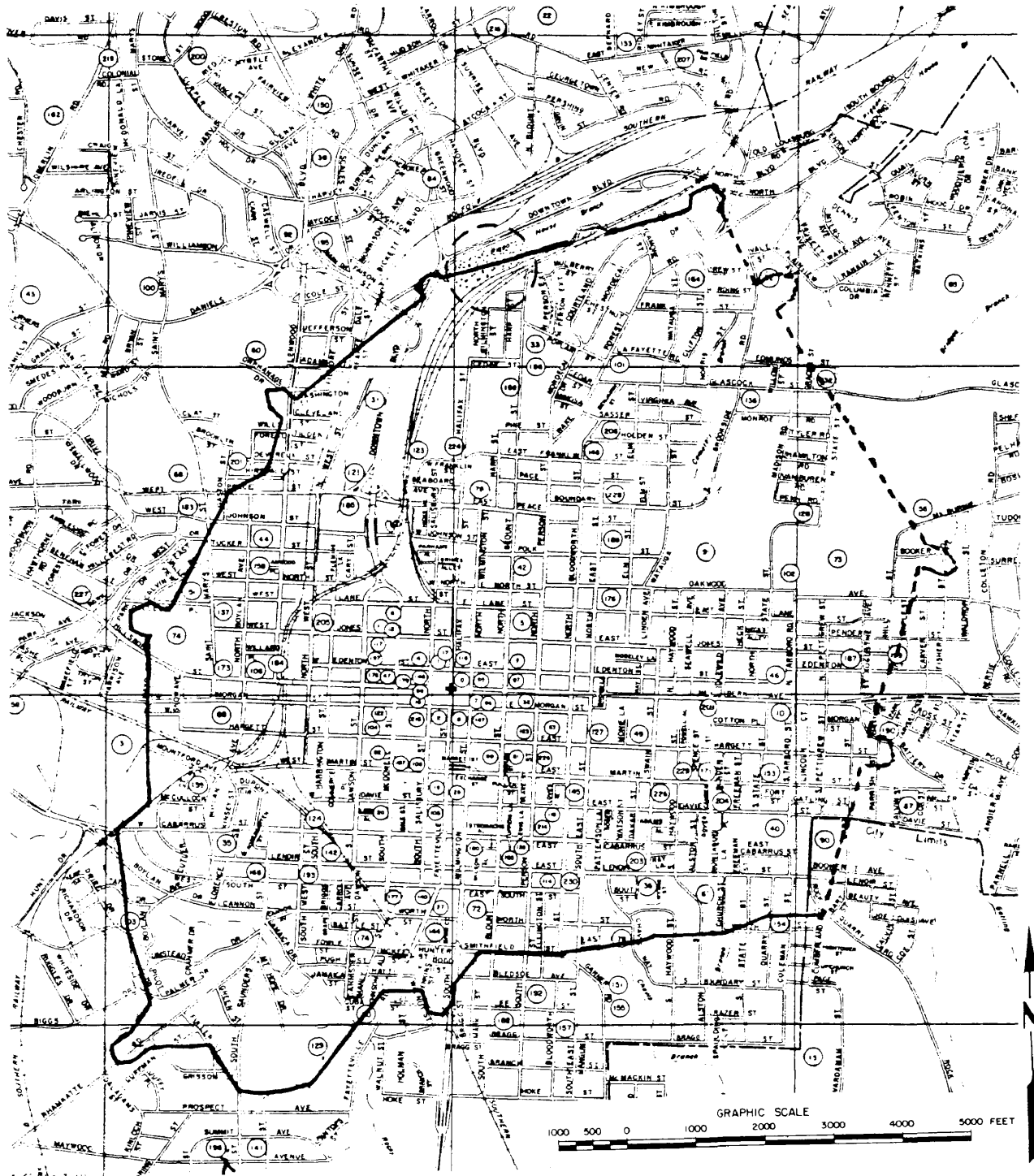


Figure 17. Retracing of the Confederate defenses on a current city map of Raleigh, North Carolina.



Figure 18. View of the wooded area in which the northern fortification network is located . The tracks of the Seaboard Coast Line run north/south on top of the ridge evident in the background.



Figure 19. Most clearly discernable remnant of the northern fortifications adjacent to to the Downtown Boulevard.



Figure 20. The Downtown Boulevard as seen from the main trench line in the northern fortifications.

The line of works was constructed on the side of a natural hill and elevated approximately 27 feet above land immediately to the west (Figures 21 and 22). The principal concern in planning this section was the utilization of high ground in the defense of the Raleigh and Gaston Railroad. Proper defensive strength in this area was important in monitoring the transport of troops and supplies into and out of the city.

The northern defenses were strengthened by the construction of a series of rifle or shelter pits in front of and below the main trench line (Figures 23 and 24). Whereas the main trench line was approximately eight feet wide and five feet deep, the pits were dug one and one-half to two feet deep and placed behind a small, eighty-three foot long east/west breastwork. Although it was common practice to keep the rifle pits independent of each other as an outer defense, joining the pits by means of the breastwork strengthened the flank protection offered by the works. Because the pits were located only one hundred forty feet to the north of and somewhat perpendicular to the main trench, communication between the works was adequate. Hence, the rifle pits could be easily abandoned for the main defense (Figure 25).

As previously stated, the Raleigh fortifications were first constructed at strategic points around the city and gradually connected as available time and labor permitted. Maximum simplicity in design was achieved by strengthening

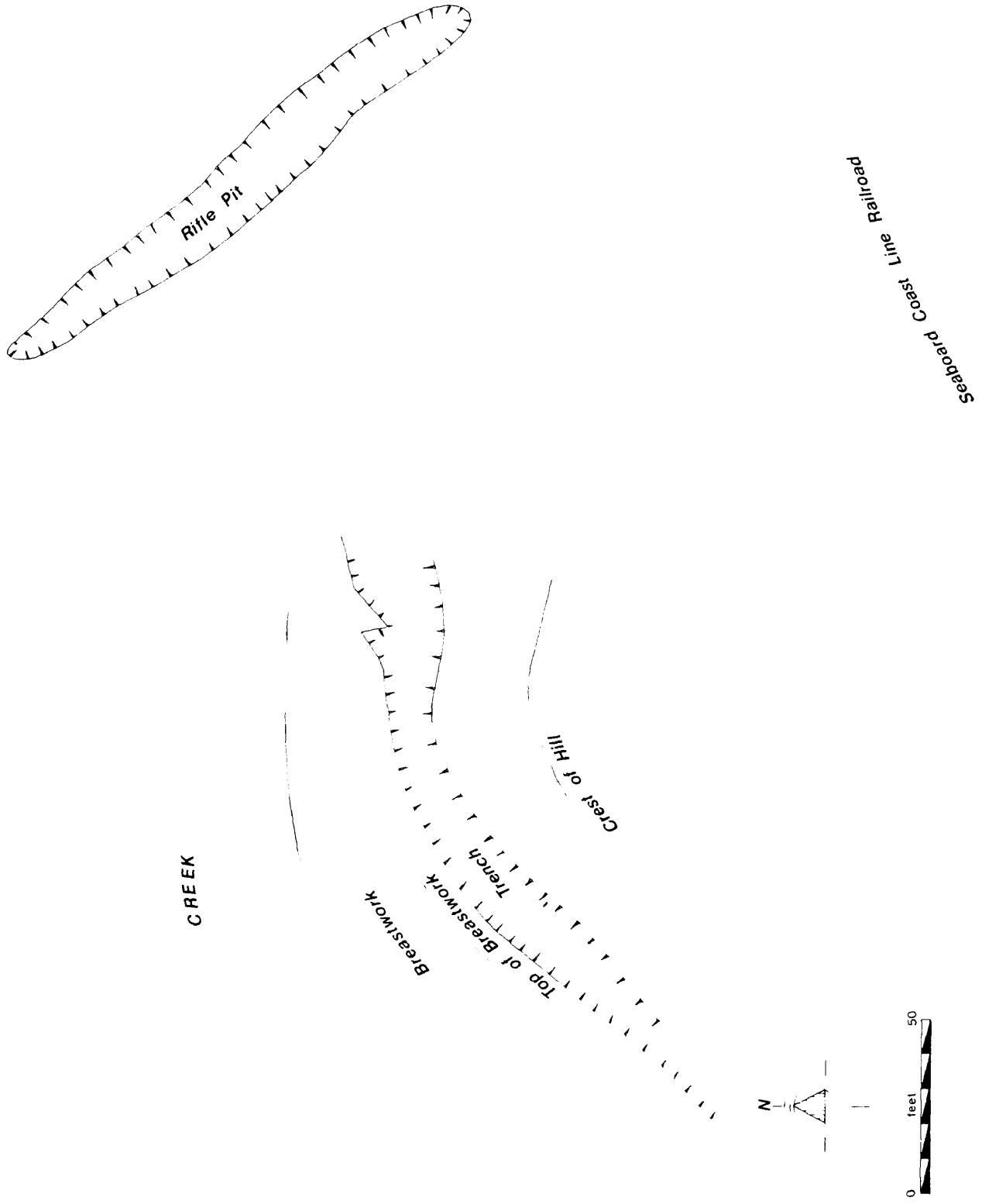


Figure 21. Plan view of northern fortifications identified in the 1936 Federal Writer's Project and adjacent to the Downtown Boulevard.

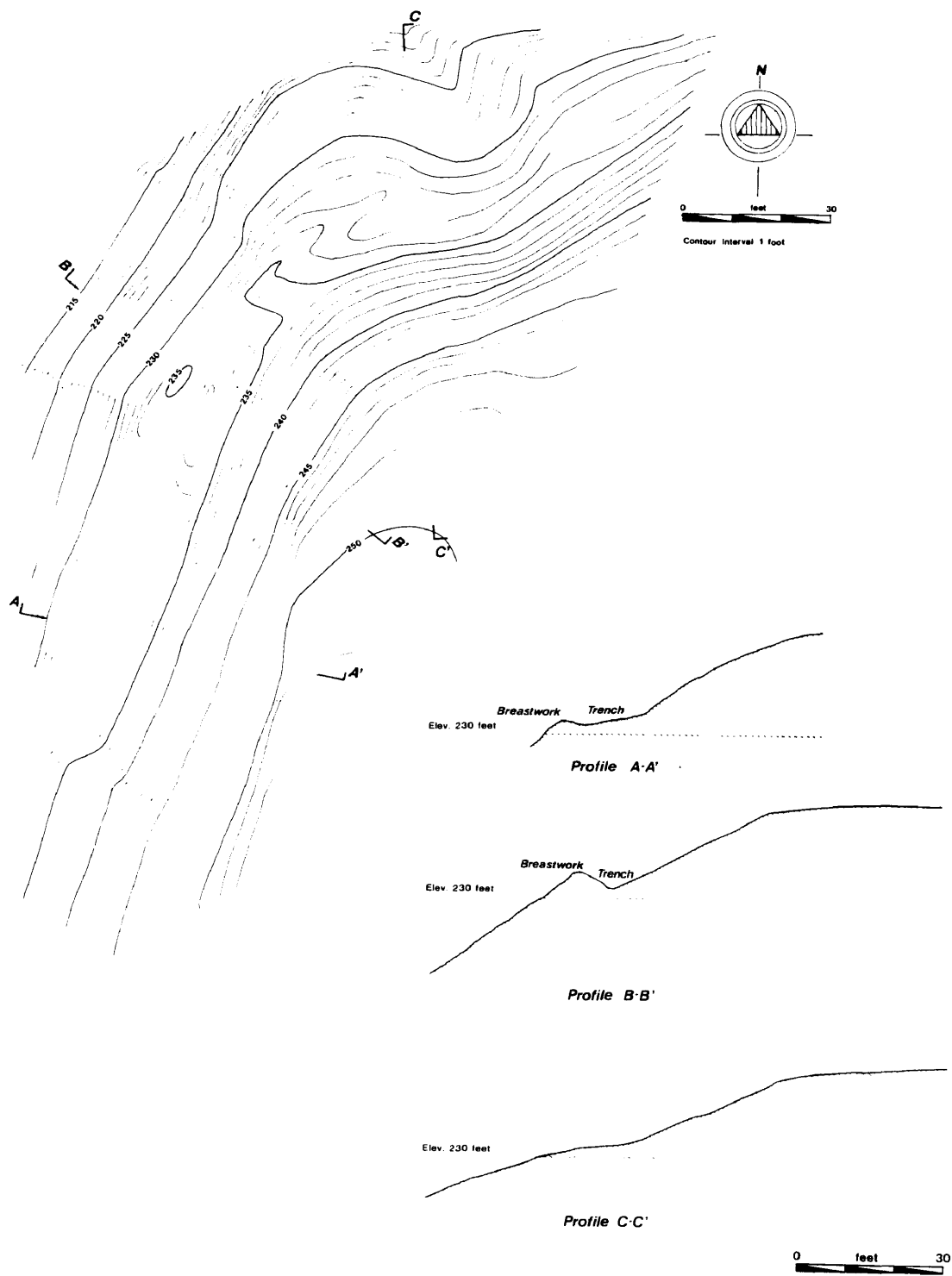


Figure 22. Contour map of a segment of the northern fortifications identified in the 1936 Federal Writer's Project.



Figure 23. Rifle pits constructed immediately north of and below the main trench line in the northern fortifications. Note the railroad cars of the Seaboard Coast Line in the background.



Figure 24. Rifle pits constructed immediately north of and below the main trench line in the northern fortifications.



Figure 25. View of the main trench line as seen from the ridge above and behind the fortifications.

those points most capable of strong resistance. Trench lines connected these points and were extended to incorporate areas vulnerable to attack. They were strategically placed with gun emplacements on high ground and thus provided strong defensible positions. In addition to the careful placement of the works, the Raleigh fortifications, like the American defenses of Philadelphia, were constructed with the understanding that unnecessary elaboration in fortification does not lead to the success of the work nor can it stop a determined enemy.

CIVILIAN REACTION TO THE RALEIGH FORTIFICATIONS

Prior to the completion of the fortifications, the citizens of Raleigh were reassured that effective measures were being taken to protect their city from Federal raids. In August of 1863, General Joseph Johnston inspected Lieutenant Colonel Guion's defensive works. It was reported in the Raleigh Registrar "that the strong and weak points of our defenses have been closely scanned by the intelligent eye of the commanding General, and provisions made for promptly strengthening such parts as requires it" (North Carolina State Archives 1863c:2).

In addition to the high level of planning that went into the construction of such an "extensive system of works" a movement was under way to organize the civilian inhabitants of the city into a home guard. The attitude of the population

during the last phase of construction of the fortifications was that "every citizen of Raleigh able to bear arms, and large numbers of citizens from other points who have tendered their services, will man these entrenchments" (North Carolina State Archives 1863e:1). On Tuesday, July 14, 1863, a large number of citizens gathered at the courthouse where

Governor Vance was present and explained the object of the meeting. In the course of his remarks, he entered into the details of the means of the defense within his power. It was announced to the meeting, and amid loud applause, that the cadets of the Hillsboro Military Academy had volunteered their services in any emergency to defend the city; also that the employees of the North Carolina Railroad had organized themselves into a company for the same purpose (North Carolina State Archives 1863b:3).

A meeting had been held at the same location several days earlier and it also concerned the

means of placing the city in a state of defence against Yankee raids. The meeting was addressed by Governor Vance and Ex-Governor Bragg, after which there was an enrollment of a large number of names for service, either in the cavalry, artillery or infantry branch of the service. Every man in Raleigh who can do duty will, we are sure, do so if the emergency requires it, and we feel very sure that if Yankee thieves come here after wool, they will go back shorn (North Carolina State Archives 1863f:1).

There was growing concern among the citizens of Raleigh that the capital would soon be attacked by the Federals. Warsaw, North Carolina had been raided on July 8, 1863 and Rocky Mount on the 29th of the same month. The enemy, it was said, saved nothing.

Whatever is valuable, that can be carried off, they steal; what cannot be removed, they destroy. Mills, graineries, cattle, horses, slaves, provisions of all kinds -- even agricultural implements; what may be of most importance

to our people, or the destruction of which would cause the most suffering, seem to be the objects at which their efforts are chiefly directed... (North Carolina State Archives 1863d:2).

Descriptions of such warfare tactics were commonplace in Raleigh newspapers in 1864-1865 and as the war grew closer to home, they served with other articles to instill hatred and fear into the people, while at the same time reaffirming the defensive measures taken to protect the community (Figure 26). Citizens "prepared for the fate which had befallen Atlanta, Savannah, Columbia, and other cities which had been captured by Sherman" (Yates 1941:327). His policy in his march through the south is evident in several of his statements. He concluded that

until we can repopulate Georgia, it is useless to occupy it; but the utter destruction of the roads, houses and people will cripple their military resources... I can make the march, and make Georgia howl (Sherman quoted from Fuller 1961:108).

He stated with regard to South Carolina that

we are not only fighting hostile armies, but a hostile people, and must make old and young, rich and poor, feel the hard hand of war... The truth is the whole army is burning with an insatiable desire to wreak vengeance upon South Carolina. I almost tremble at her fate (Sherman quoted from Fuller 1961:109).

The route of his march into North Carolina and towards the capital, was predicted by several Confederate generals. "Generals Beauregard, Johnston, Hardee, Hoke, Hampton, and Wheeler assembled their forces thinking that perhaps Raleigh could be defended" (Yates 1941:326). The prospect of such a stand grew dim as Sherman's troops advanced rapidly. "Gover-



Figure 26. "The Southern viewpoint" as depicted by the artist John Adalbert Volck (Angle 1967).

nor Vance asked General Johnston what was the best thing to do and he replied -- that he should make the best terms he could for the protection of the capital city and its people" (Yates 1941:327)

...General Johnston had given Governor Vance notice of his intention to uncover Raleigh, so that such preparation as could be made to meet the emergency had been finished. A vast amount of state property had been removed to various places along the North Carolina Railroad, mainly to Graham, Greensboro, and Salisbury, including blankets, clothing, overcoats, English cloth enough for 100,000 uniforms, 10,000 pair of shoes, great quantities of cotton cloth, yarns, cotton cards, bacon, corn, medical stores, 6,000 scythe blades, together with the public records, Vance and the other state officers having worked day and night so that before noon on April 12, everything had been shipped (Olds 1915:2).

Governor Vance took the advice of General Johnston and on April 12, 1865, sent Surgeon-General Edward Warren, Colonel Jason Burr, and Major John Devereaux by train to meet with General Sherman. The train, however, was stopped by the Confederate forces of General Hampton and was ordered by the General to return to Raleigh. The train reversed its direction and, before reaching Raleigh, was stopped by Federal troops. The representatives of the governor were escorted to Clayton where they met with Sherman. They conveyed the governor's request that the city be spared and that a peaceful transition of authority take place. Sherman assured the individuals that the governor's wishes would be respected as long as no resistance was met.

At sunrise of a cloudy day, April 13, 1865, a "cortege" for the city rode out of Raleigh to meet Sherman. Its mission was to formally surrender the capital. In the

carriage were Raleigh's mayor and a few other leading citizens. One of them, riding in the seat with the driver, carried a stick with a white cloth tied to its tip. He planted the surrender symbol above the empty fortifications and the group waited in the rain until eight o'clock that morning when, through fieldglasses, Sherman's advanced cavalry came into sight (Waugh 1967:82).

The town was quiet as his troops marched in. Sherman himself remained only briefly. Before his departure to Durham, he ordered three of his men to destroy Whitaker's Mill. This was the only destruction that took place and "on the whole, the frightened little city was scarcely touched" (Yates 1941:331). For the citizens of Raleigh, the War was over.

CHAPTER IV

MAXIMUM BENEFIT THROUGH MINIMAL EFFORT

Research on the Confederate defenses around Raleigh provides not only an historical account of their construction but considerable insight into their practical value as a means of protecting the city. The primary goal in this research is to evaluate the fortification system based on the efficiency of its construction in relation to the general type of warfare practiced during the last three years of the Civil War. Prior to this evaluation, a discussion of efficient action will clarify the relationship between this field of study and fortification construction around the city

EFFICIENT ACTION AND THE PRINCIPLE OF LEAST EFFORT

Efficient construction with effective results were two basic engineering goals in field fortification construction. In order to better understand these goals and their applicability to the defensive works of Raleigh, a discussion of efficient action is appropriate. "The science of efficient action, whatever the field of activity, a one minute performance or a gigantic undertaking, has received the name of praxiology" (Skolimowski 1965:349). It is a science based on

the study of practical values; values temporarily divorced from those of a moral or aesthetic nature. "Praxiology is concerned with establishing norms of efficient action, and also with evaluating the efficiency of performed actions. It is a normative discipline" (Skolimowski 1965:355).

The science of praxiology had its formal beginning in the early 20th century with the writings of the Polish philosopher Tadeusz Kotarbinski. His Practical Essays (1913) and A Treatise on Good Work (1955) were major contributions in shaping the discipline as a science. Earlier attempts at establishing a general theory for efficient action had been pursued by writers such as Dunoyer (1845), Bourdeau (1882), and Espinas (1897). While these scholars contributed to this particular aspect of human action, Kotarbinski is largely credited with developing praxiology to its current state.

The method of praxiological study is based on the analysis of practical values, that is, values of efficient action. One such value is the economization of human mental and physical energy. Skolimowski (1965:355) notes that several approaches are often taken to minimize the expenditure of energy and are evident in a variety of actions. The construction of the Raleigh fortifications, for example, minimized the potential impact of the Federal cavalry on the economic sectors of the city. The construction of the fortifications on high ground at strategic locations and subsequent connection of the works, created angles of fire too great

to allow a successful attack. As a consequence, the Raleigh defenders occupied an advantageous position compelling Federal raiders to occupy a disadvantageous position. The Federals would have needed three times the number of individuals manning the entrenchments to equal the advantage afforded the defenders from their fortified positions. Hence, the Federals would have expended considerably more energy in attacking the city than the Confederates in defending it.

Skolimowski points out that the economization of energy is also achieved by "replacing physical efforts by reflection" (1965:355). Lieutenant Colonel Guion and his staff of engineers minimized unnecessary physical efforts by utilizing established principles and techniques of field fortification construction. Guion's defensive plan for Raleigh focused on the implementation of defensive strategies and tactics in his fortification design while adhering to the principle of simplification of procedure. His "method" or approach to the construction of the defenses was synonymous with what Skolimowski describes as "system of action" which refers to a way of performing a complex action. The action is well-planned and "can be systematically applied and consists in the proper selection and composition of the elements of the action" (1965:357).

If a system of action is carefully planned, then the expenditure of human energy will be minimized and the probable success of the activity enhanced. The degree of suc-

cess is dependent on an increase in effectiveness although some losses occur in order to attain more substantial gains (Skolimowski 1966:377).

A great deal of insight into technological progress can be achieved through the application of the praxiological model. This requires that the researcher of a specific branch of learning examine the "pattern of thinking" within that discipline.

Specific branches of learning originate and condition specific modes of thinking and adhere to categories through which they can best express their content and by means of which they can further progress (Skolimowski 1966:378).

For example, surveyors think in terms of accuracy; structural engineers, in terms of strength; and architects, primarily in terms of aesthetics. Military engineers think of fortification as the utilization and transformation of nature to maximize the advantages of strong defensive position. Regardless of the discipline, technical development is measured by attempts to maximize effectiveness while minimizing effort. Zipf (1949:1) states that a

person in solving his immediate problems will view these against the background of his probable future problems, as estimated by himself. Moreover, he will strive to solve his problems in such a way as to minimize the total work that he must expend in solving both his immediate problems and his probable future problems. That in turn means that the person will strive to minimize the probable average rate of his work-expenditure over time.

The success of the fortification plan for Raleigh was contingent upon the action having certain characteristics. Guion's

design showed a high degree of feasibility, inner harmony, flexibility, and maximum simplicity. A continuous supply of laborers made feasible the construction of extensive works. Construction of the fortifications in stages at the most strategic locations around the city insured proper defensive strength without unnecessary elaboration. The subsequent connection of the strategic points with simple trenches established the works as a complete fortification network. The strengthened positions and connecting trenches were mutually supportive and hence, reduced the possibility of failure in any part of the defensive plan.

The simple design of the Raleigh fortifications minimized the amount of human energy necessary to construct them and enhanced their probable success against attack. Success, however, was also dependent on maximizing the effectiveness of an extensive fortification system. The proper management of the defensive network was essential and, as suggested by numerous defense rallies, required the active participation of the civilian populace. Although the fortifications lacked the complexity of more advanced forms of fieldworks, the carefully planned system of action by which they were constructed allowed adequate defense for the city and its inhabitants.

"VANCE'S FOLLY" ?

Governor Vance's decision to begin construction on fortifications around the city of Raleigh in May of 1862

was an attempt to counter the impact of potential Federal cavalry raids on the economic sectors of the city. His decision was backed by strong public support in Raleigh and agreeable to many North Carolinians who were to supply slave laborers from counties across the state. The first year of construction passed without incident and after fourteen months of construction, the fortification network neared completion. During the month of July, 1863, however, just prior to the completion of the works in August, a town less than fifty miles from the capital was attacked by Federal raiders. The severity of the damage spawned numerous appeals among the inhabitants of Raleigh to organize a home defense. Several public meetings were held in which "there was an enrollment of a large number of names for service, either in the cavalry, artillery, or infantry branch of service" (North Carolina State Archives 1863f:1). Despite the enthusiasm of the rallies and the pledges of support from citizens such as the employees of the North Carolina Railroad, the success of the meetings was questionable. The male inhabitants of the city and surrounding area were criticized in the days following the meetings because of their failure to seriously organize and prepare for the threat that the city and its inhabitants faced. Although it was acknowledged prior to the completion of the fortifications that "cavalry raids are getting to be serious things to the people of the Confederacy -- especially to the quiet inhabitants of the goodly city..." (North Carolina State

Archives 1863g:1), successful attempts to organize able-bodied citizens for home defense did not materialize. The population was content to react to an attack on the city only when and "if the emergency requires it" (North Carolina State Archives 1863f:1).

In response to the public attitude, local newspapers addressed the issue in a direct manner. It was bluntly stated that

This is an emergency -- this city is in peril -- and those who have as yet found excuses for doing nothing, who have not lifted a finger for the Confederacy, in any way, have now the chance to show their pluck or cowardice, and he who falters now makes himself infamous for all time (North Carolina State Archives 1863g:1).

On July 15, 1863, an article appeared in the Raleigh Registrar and was directed more specifically "TO THE MEN OF RALEIGH".

Men of Raleigh, read the letter of the Kinston correspondent of the State Journal and say what you are doing for the protection of your homes. True, a large number of hands are working on your defenses, but where is the organization for manning them? Where is the cavalry company for scouting and bringing in the earliest intelligence of the whereabouts and movements of the enemy? Wake up, wake up, unless you prefer depredation and outrage to a manly defense of your lives and property (North Carolina State Archives 1863a:2).

This was followed on the 21st of the same month by another article which stated that "Ditching will not save us but a vigilant home organization will" (North Carolina State Archives 1863h:1). These sentiments suggest that the defense of Raleigh against Federal raids was partly dependent on the active participation and organization of the civilian population. Contrary to the optimism expressed in local

defense meetings, the inhabitants had increased fear of impending doom in 1863. Economic conditions had worsened and the inevitable fate of the Confederacy and the city was apparent.

Attempts to organize a local defensive force, regardless of its success, was a response to the serious threat faced by the inhabitants of the city. The public rallies functioned not only to organize and mobilize a defensive force but also to reduce the high level of stress and uncertainty in the population. According to Chapple (1970) and Altner (1969), the regular gathering and interaction of civilians not only reduced their level of anxiety but encouraged differences of opinion to be resolved. "Mobilization, by the threat of attack or its actual occurrence, disturbs all and is the strongest of unifiers. It intensifies the emotional-interactional patterns of conflicts..." (Chapple 1970:307).

In contrast to the high level of organization and planning in the construction of the Raleigh fortifications, the organization and implementation of local civilian defensive measures in the city were poorly coordinated and lacked implementation. The fortifications, largely the result of a military effort using slave laborers, were unmanned for two years following their completion in August of 1863 and were abandoned upon the approach of Sherman's forces in April of 1865 (Waugh 1967:82). During this period of time, and for

several years following the surrender of the city, many inhabitants of Raleigh referred to the entrenchments as "Vance's Folly" because "the war governor was held responsible for them" (Briggs 1936:1). The governor was accused of lacking a good sense of foresight in ordering the construction of an extensive system of works that were never to be used.

CONCLUSION

The fortifications of Raleigh were constructed in a very efficient manner by an experienced and competent engineering officer in the Confederate States Army. His construction techniques were well-established prior to their application in the defensive works at Raleigh and based on principles utilized at Philadelphia eighty-three years earlier in the American Revolution.

The basic principles of fortification construction common in the building of defensive works during the Revolution and the Civil War were based on maximizing the effectiveness of the fieldworks while minimizing the efforts required to construct them. The construction of fortifications in stages allowed the simplest forms to be built at the most strategic locations and then gradually developed into more substantial works as available time and labor permitted. The utilization of natural topography, such as high ground, and the concealment of works in the local environment increased the advantages offered by fortified positions. One of the primary tenets in fieldwork design was limited

construction void of unnecessary elaboration. Although painfully learned by many (Bailey 1983:122) and completely ignored by some (Mitchell 1968:14), limitation and simplification were vital considerations in field fortification construction. Such considerations were important as soldiers became more professional, weapons more accurate, and strategies and tactics more diverse.

The Raleigh fortifications were primarily built to counter the advantages afforded Federal raiders in potential skirmish attacks against the city. Raids were characterized by swift, calculated attacks directed against the economic base of cities and towns. By 1863, they were an important strategy in Federal campaigns to defeat the south. Warfare, in all its reality, was taken to the people and, although not directly inflicted upon the citizens of Raleigh, seemed an inevitable fate. Fortification construction was a practical response to a very real threat. The organization and active participation of the civilian population, however, was also essential in combating the type of warfare waged against the city and its inhabitants.

The citizens of Raleigh and the surrounding area did not react to the threat that faced the city until the defenses neared completion in the summer of 1863. No evidence indicates or suggests that the white civilian inhabitants of Raleigh directly participated in the construction of the works nor did they effectively organize a citizenry

military force during the thirteen months prior to their completion. Although the effective organization of a local defensive force was never established, the numerous rallies held during the month of July 1863, transformed a period of public fear, confusion, and indifference into public unity. The meetings temporarily reduced the high level of anxiety brought on by a depressed economy, the inevitable defeat of the Confederacy, and the approach of General Sherman's forces.

The abandonment of the fortifications in 1865 was not due to the citizens' failure to properly organize and implement a local defense plan. The utilization of such a force would have been effective against a raid but not against the offensive launched by General Sherman. Likewise, the defensive works around the city were simple in nature and limited in strength. They were not siege works and offered little advantage against a major offensive by a determined enemy. Sherman, not fully aware of their limited strength and informed of Governor Vance's call for batteries of artillery to be sent to the city (Olds 1915:2), stated in a dispatch to General Kilpatrick

I will push all the columns straight on RALEIGH. I do not care about RALEIGH now, but want to defeat and destroy the Confederacy. Do not break the railway between here and RALEIGH as we want the rails up to that city (Sherman quoted from Olds 1915:2).

The fate of Raleigh was determined not only by Sherman but by General Johnston and Governor Vance. It was acknowledged

by all three individuals that the survival of the city and its inhabitants was dependent on the abandonment of all Confederate resistance, including the symbols of resistance such as the fortification network around the city.

APPENDIX

The following photographs are of remnants of the northern extension of the Civil War fortifications around Raleigh, North Carolina. They are located on the eastern side of the Downtown Boulevard and adjacent to the tracks of the Seaboard Coast Line. Their precise location is found in the description provided in the Federal Writer's Project of 1936 (Figures 16 and 17).



Southwest view of the main trench line in the northernmost fortifications. Note the rise in elevation to the east (left) with a noticeable drop in elevation to the west (right).



View of the main trench line looking north in the northernmost fortifications.



Northwest view of the main trench line in the northern fortifications.



Northern view of the main trench line in the northernmost fortifications.



View of the main trench line as seen from behind the northernmost fortifications.



Northernmost remnant of the main trench line in the northern fortifications.



Eastern view of the hillside behind the major breastwork in the northernmost fortifications.



View of the main trench line in the northern fortifications. Note the immediate drop in elevation in front (west) of the main breastwork.



A noticeable change in the size and height of the breastwork in the northern fortifications suggests that the position may have been the location of a gun emplacement. Refer to the location of the site on the Confederate plan of the works (Figure 13).



Erosion on the outer (western) face of the main breastwork in the northern fortifications.

BIBLIOGRAPHY

- Altner, G. (editor)
1969 The Nature of Human Behavior. London: George Allen and Unwin LTD.
- Angle, P. M.
1967 A Pictorial History of the Civil War Years. Garden City, NY: Nelson Doubleday, Inc.
- Ashe, S. A.
1925 History of North Carolina. Raleigh, NC: Presses of Edwards and Broughton Printing Company.
- Babits, L. E.
1980 "Cultural Transmission: A Military Example in the Eighteenth Century". Paper presented at the 1980 meeting of the Society for Historical Archaeology, Albuquerque, New Mexico.

1984 Personal communication. Letter of 19 April.
- Bailey, R. H.
1983 Forward to Richmond: McClellan's Peninsular Campaign. Alexandria, VA: Time-Life Books, Inc.
- Bloomfield, R. T.
1971 Sebastien le Prestre de Vauban 1633-1707. New York: Barnes and Noble, Inc.
- Brackenbury, C. C.
1888 Fieldworks: Their Technical Construction and Tactical Application. London: Kegan, Paul, Trench, and Company.
- Briggs, W. C.
1936 "Breastworks Never Used". The News and Observer. Raleigh, North Carolina. 30 July.
- Chapple, E. D.
1970 Culture and Biological Man: Explorations in Behavioral Anthropology. New York: Holt, Rinehart and Winston, Inc.

- Clark, C.
1984 Decoying the Yanks: Jackson's Valley Campaign.
Alexandria, VA: Time-Life Books, Inc.
- Clarke, S.
1909 Fortification: Its Past Achievements, Recent
Development, and Future Progress. 2nd edition.
London: John Murray.
- Coen, B. T., E. I. McGrew and C. E. Morris
1981 Guide to Private Manuscript Collections in the
North Carolina State Archives. Raleigh, NC:
North Carolina Division of Archives and History,
Department of Cultural Resources.
- Coker, C. W. F.
1966 Guide to Civil War Records in the North Carolina
State Archives. Raleigh, NC: North Carolina
Division of Archives and History, Department of
Cultural Resources.
- Corbitt, D. and E. Wilborn
1973 Civil War Pictures. Raleigh, NC: North Carolina
Division of Archives and History, Department of
Cultural Resources.
- Curry, J. L. M.
1900 Civil War History of the Confederate States.
No publishing information.
- Davis, B.
1969 Yorktown: The Winning of American Independence.
New York: Harper and Row.
- Deetz, J.
1977 In Small Things Forgotten: The Archaeology of
Early American Life. Garden City, NY: Anchor
Press, Doubleday.
- Esper, T.
1965 "The Replacement of the Longbow by Firearms in the
English Army". Technology and Culture. Vol. VI,
No. 3, pp. 382-393.
- Fagan, B. M.
1980 People of the Earth: An Introduction to World
Prehistory. Boston: Little, Brown and Company.
- Falls, C.
1961 The Art of War: From the Age of Napoleon to the
Present Day. New York: Oxford University Press.

- Ford, W. C.
 1971 Defences of Philadelphia in 1777. Reprint of 1897 edition. New York: DaCapo Press.
- Frothingham, R.
 1872 History of the Siege of Boston and of the Battles of Lexington, Concord, and Bunker Hill. 3rd edition. Boston: Little, Brown and Company.
- Fuller, J. F. C.
 1961 The Conduct of War 1789-1961: A Study of the Impact of the French, Industrial, and Russian Revolutions on War and its Conduct. New Brunswick, NJ: Rutgers University Press.
- Gulley, N. Y.
 1936 "Beautiful But Not True". The News and Observer. Raleigh, North Carolina. 29 July.
- Hoban, C. (editor)
 1935 Pennsylvania Archives. Vol. VIII. No publishing information.
- Johnston, R.
 1967 Campfires and Battlefields: A Pictorial Narrative of the Civil War. New York: The Civil War Press.
- Ketchum, R. M.
 1960 The American Heritage Picture History of the Civil War. New York: American Heritage Publishing Company, Inc.
- Lender, M. E.
 1979 The River War: The Fight for the Delaware, 1777. Trenton, NJ: New Jersey Historical Commission.
- Leone, M. P.
 1978 "Archaeology as the Science of Technology: Mormon Town Plans and Fences". Historical Archaeology: A Guide to Substantive and Theoretical Contributions. Robert L. Schuyler, editor. Farmington, NY: Baywood Publishing Company, Inc.
- Lord, F. A.
 1965 Civil War Collector's Encyclopedia. Secaucus, NJ: Castle Books.
- Mahan, D. H.
 1852 A Treatise on Field Fortification. New York: John Wiley and Sons.

- Mercur, J.
1888 Mahan's Permanent Fortifications. New York: John Wiley and Sons.
- Mitchell, A.
1968 "Jackson's Engineer". Civil War Times. Vol. VIII, No. 3.
- Mumford, L.
1961 The City in History: Its Origins, its Transformations, and its Prospects. New York: Harcourt, Brace, and Jovanovich.
- Neuman, G. C.
1967 The History of the Weapons of the American Revolution. New York: Bonanza Books.
- North Carolina State Archives
1862 "An Act Concerning Slave Labor on Public Works". The North Carolina Standard. Raleigh, North Carolina. 20 December.
- 1863a "To The Men of Raleigh". Raleigh Registrar. Raleigh, North Carolina. 15 July.
- 1863b "Public Meeting Held in Raleigh". Weekly State Journal. Raleigh, North Carolina. 15 July.
- 1863c "Our Defenses". Raleigh Registrar. Raleigh, North Carolina. 22 August.
- 1863d "Local". Weekly State Journal. Raleigh, North Carolina. 2 July.
- 1863e "Fortifications of Raleigh". Raleigh Registrar. Raleigh, North Carolina. 11 July.
- 1863f "Defense of Raleigh". Raleigh Registrar. Raleigh, North Carolina. 8 July.
- 1863g "Yankee Raids -- How to Protect Ourselves Against Them". Daily Progress. Raleigh, North Carolina. 7 July.
- 1863h "Rally for Home Defense". Daily Progress. Raleigh, North Carolina. 21 July.
- 1864 "An Act Concerning Slave Labor on Public Works". The North Carolina Standard. Raleigh, North Carolina. 27 January.

- 1865 "Attack on Wilmington". Weekly Standard. Raleigh, North Carolina. 4 January.
- 1936 "Line of Defense Being Retraced". The News and Observer. Raleigh, North Carolina. 26 July.
- Oberholtzer, E. P.
1912 Philadelphia: A History of the City and Its People. Philadelphia: S. J. Clarke Publishing Company. Vol. I.
- Olds, F. A.
1915 "Fiftieth Anniversary of Surrender of Raleigh: Graphic Story of Event Furnished by Records and Eye Witnesses". The Raleigh Times. Raleigh, North Carolina. 13 April.
- Ropp, T.
1962 War in the Modern World. New York: Duke University Press.
- Ross, S.
1979 From Flintlock to Rifle: Infantry Tactics, 1740-1866. Cranbury, NJ: Associated University Presses, Inc.
- Rothrock, G. A.
1968 A Manual of Siegecraft and Fortification. Sebastien le Prestre de Vauban. Translated, with an introduction. Ann Arbor, MI: The University of Michigan Press.
- Skolimowski, H.
1965 "Praxiology -- The Science of Accomplished Acting". The Personalist. Vol. XLVI, No. 3.
1966 "The Structure of Thinking in Technology". Technology and Culture. Vol. VII, No. 3.
- Snyder, F. E. and B. H. Guss
1974 The District: A History of the Philadelphia District U. S. Army Corps of Engineers, 1866-1871. Philadelphia: U. S. Army Engineering District.
- South, S.
1976 "Fort Granger". The Society for Historical Archaeology Newsletter. Vol. 9, No. 2.
- Spaulding, A. L., H. Nickerson, and J. Wright
1925 Warfare: A Study of Military Methods From Earliest Times. New York: Harcourt, Brace, and Company.

Spraggins, T. L.

- 1941 "Mobilization of Negro Labor for the Department of Virginia and North Carolina, 1861-1865". The North Carolina Historical Review. Vol. XVIII, No. 4.

Swem Library, The College of William and Mary, Williamsburg, VA

- 1800- United States War Department Registers of Letters
1870 Received by the Office of the Secretary of War, Main Series. Microcopy No. M-221, Roll No. 277.

- 1861- Confederate States of America. War Department
1865 Letters Received by the Confederate Adjutant and Inspector General. September-December 1863, F(677-1034) and February-September 1863, G(11-935).

- 1862- Copies of Letters and Telegrams Sent and Received
1865 by Governor Zebulon B. Vance of North Carolina. Microcopy No. T-731, Roll No. 1, M-7631.

Vayda, A. P.

- 1976 War in Ecological Perspective: Persistence, Change, and Adaptive Process in Three Oceanian Societies. New York: Plenum Press.

Viollet-Le-Duc, E. E.

- 1876 Annals of a Fortress. Boston: James R. Osgood and Company.

Waugh, E. C.

- 1967 North Carolina's Capital, Raleigh. Raleigh, NC: Junior League of Raleigh, Inc.

Yates, R. E.

- 1941 "Governor Vance and the End of the War in North Carolina". The North Carolina Historical Review. Vol. XVIII, No. 4.

Zipf, G.

- 1949 Human Behavior and the Principle of Least Effort. Cambridge, MA: Addison-Wesley Press, Inc.

VITA

THOMAS FREDERICK HIGGINS, III

The author was born in Raleigh, North Carolina, on March 24, 1960. He graduated from Millbrook Senior High School in that city in June, 1978 and received a Bachelor of Arts degree in Anthropology from Appalachian State University in December, 1981. He entered the College of William and Mary in Virginia in September, 1982 and completed course requirements for the Master of Arts degree in Anthropology in May, 1983.

The author has participated in the excavation of several historic sites in western North Carolina, Virginia, Maryland, and St. Eustatias, the Netherland Antilles, West Indies. He is currently a field technician in the Department of Archaeology - Office of Excavation and Conservation, Colonial Williamsburg Foundation.